
DE HAVILLAND CANADA
BUFFALO

introduction

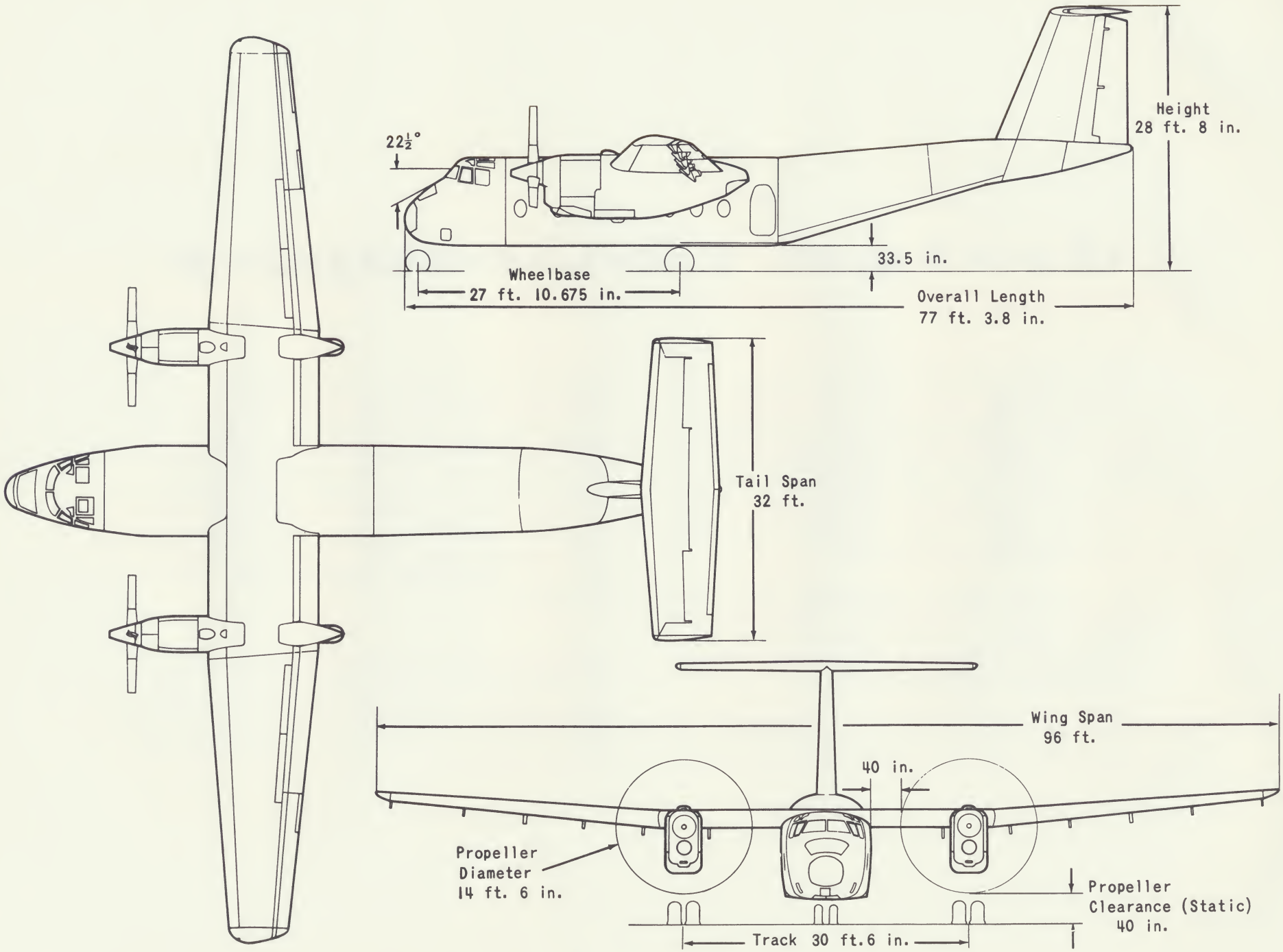
The DHC-5 BUFFALO has been specifically developed to fill existing military operational requirements for a STOL aircraft capable of handling the important short to medium range transport support operations which fall between the capabilities of the heavy helicopter and the strategic transport. The limited war operations so typical of the modern scene indicate continued similar requirements.

Four flight prototypes and one static test airframe have been developed under a shared arrangement between de Havilland and the governments of the United States and Canada. Flight tests began in April 1964 and progressed to the receipt of an FAA CAR 4(b) transport category type certificate of airworthiness. Extensive operational and performance trials by the U.S. Army followed in 1965. Some 2000 flying hours have been accumulated to date, and all performance and operational requirements have been met or exceeded.

Two of the aircraft were deployed across the Pacific to South Viet Nam in late 1965 for squadron service trials. Their performance in this complete hot-war environment was highly satisfactory. Over 400 support sorties were flown in the three month period, a clear demonstration of BUFFALO operational readiness.

The BUFFALO is now in production for the initial Canadian Defence Force order for 15 aircraft, with deliveries scheduled to begin early in 1967. Advantage has been taken of an increase in engine power and of favourable static tests resulting in higher payload and improved performance. The results of the test programs, including Viet Nam, have also been applied to improve many aspects of system performance and reliability.

This brochure portrays the outstanding features of the BUFFALO and its unique role as a rugged and versatile military transport.


22½°
Height
28 ft. 8 in.
33.5 in.
Wheelbase
27 ft. 10.675 in.
Overall Length
77 ft. 3.8 in.
Tail Span
32 ft.
Wing Span
96 ft.
40 in.
Propeller
Diameter
14 ft. 6 in.
Propeller
Clearance (Static)
40 in.
Track 30 ft.6 in.

leading particulars

GENERAL		
Wing area		945.0 sq ft
Wing Aspect Ratio		9.75
CABIN DIMENSIONS		
Length (fwd edge of ramp)		31 ft 5 in.
Width (maximum)		8 ft 9 in.
Width (at floor)		7 ft 9 in.
Floor Area		242 sq. ft
Height (on centre line)		
aft of rear spar		6 ft 10 in.
fwd of rear spar		6 ft 6 in.
Volume (rectangular)		1580 cu. ft
DOOR DIMENSIONS		
Rear Loading Door	width	92 in.
Side Doors	width	33 in.
	height	66 in.
WEIGHTS		
Design Take-off Weight		41,000 lb
Design Landing Weight		39,100 lb
Maximum Zero Fuel Weight		37,000 lb
Operational Empty Weight*		24,220 lb
Maximum Payload		12,780 lb
Maximum Fuel (Internal Tanks)		13,556 lb

ENGINES
Two General Electric Company T-64 propeller turbines, each rated at 3060 equivalent shaft horsepower for take-off.

PROPELLERS
Two Hamilton Standard 63E60, three blades, 14.5 ft dia. with integral oil system and reverse pitch.

PROPELLER CLEARANCES

Ground	40 in.
Fuselage	40 in.

AUXILIARY POWER UNIT
Williams Research WR9-7 Gas Turbine.

CARGO HANDLING
Brooks & Perkins side rail system, hydraulic winch, floor rollers.

*Includes crew of three at 200 lb each, roller conveyors, winch and loading ramp extensions.


ARMY
U.S. ARMY

operating characteristics

STOL: The BUFFALO offers outstanding STOL performance on a practical operating basis. The total takeoff distance to 50 feet from a sod strip, with a useful load of 12,380 lb, is only 1000 feet, of which 600 feet is ground run. At a maximum weight with a payload of 12,780 lb the total distance is 1260 feet, the ground run 800 feet. By exploiting these very short strips, which can be provided quickly and cheaply, the BUFFALO brings to close support operations the great advantages of fixed wing transport.

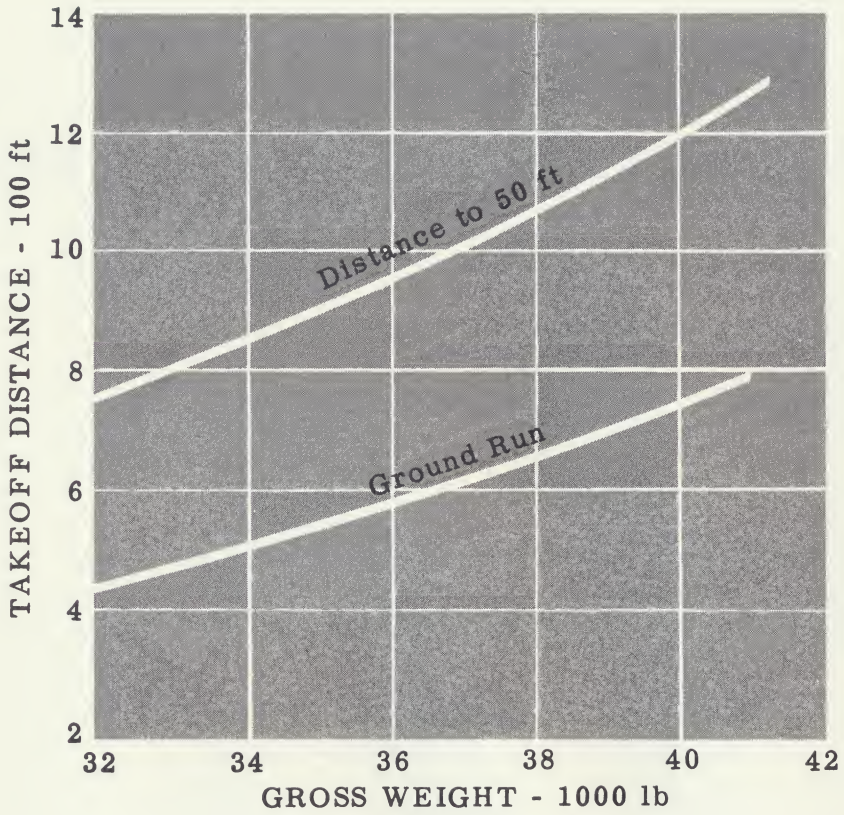
COMBAT AIRSTRIP CAPABILITY: The BUFFALO operates continuously at full load from soft surfaces of CBR 2.4 value which contemporary transports can only use for limited numbers of reduced weight operations. In addition, the wide track layout of the main gear permits normal operations in high crosswinds and on very rough natural terrain.

LOW SPEED FLIGHT: The exceptional low speed stability and handling characteristics of the BUFFALO, effective at 70 knots, enable operational pilots to carry out short field work, confined airspace manoeuvres, and air drops easily, safely, and with routine high precision under adverse weather and visibility conditions.

PAYLOAD DELIVERY: The high performance features of the aircraft are supplemented by a practical airframe layout and modern systems to permit efficient payload delivery by airland, air drop, or lolex.

COST EFFECTIVENESS: The unique ability of the BUFFALO to operate continuously and efficiently from primitive airstrips under severe conditions of crosswind, poor visibility, and restricted airspace makes it by far the most economical aircraft now available for forward area support.

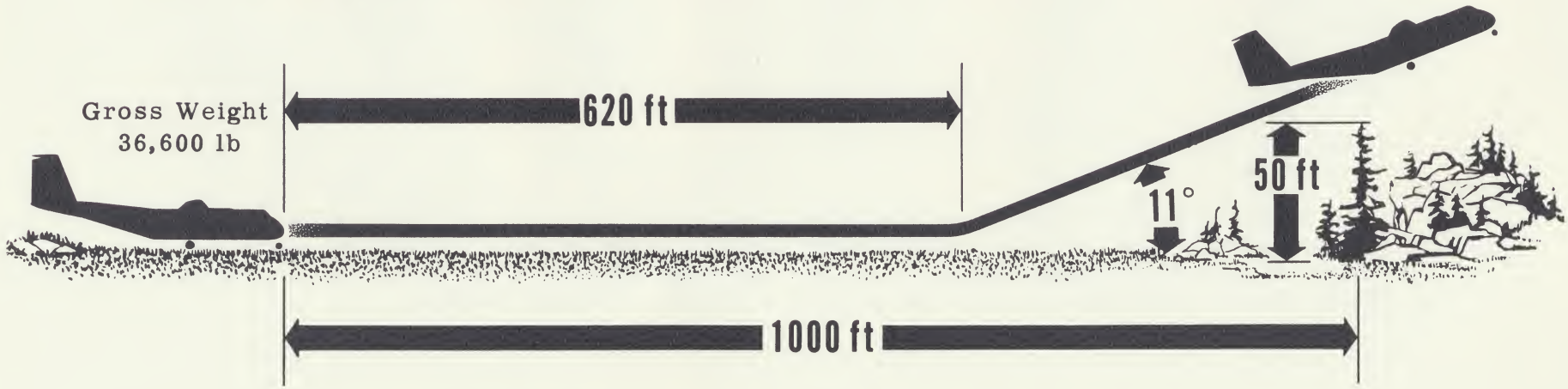
DEPLOYMENT: The extra fuel ferry range of up to 3546 nm with reserves, and self-contained operation, make it possible to deploy the BUFFALO quickly to operational theatres over long distances by normal direct routes.



short-field takeoff

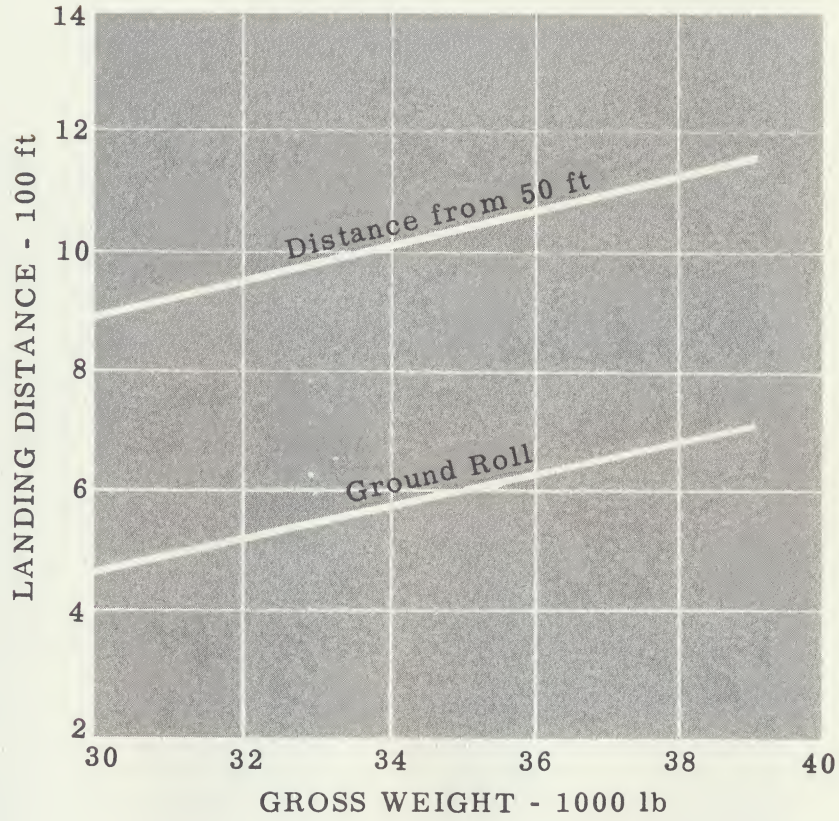
Zero Wind, Firm Dry Sod
Sea Level, ISA

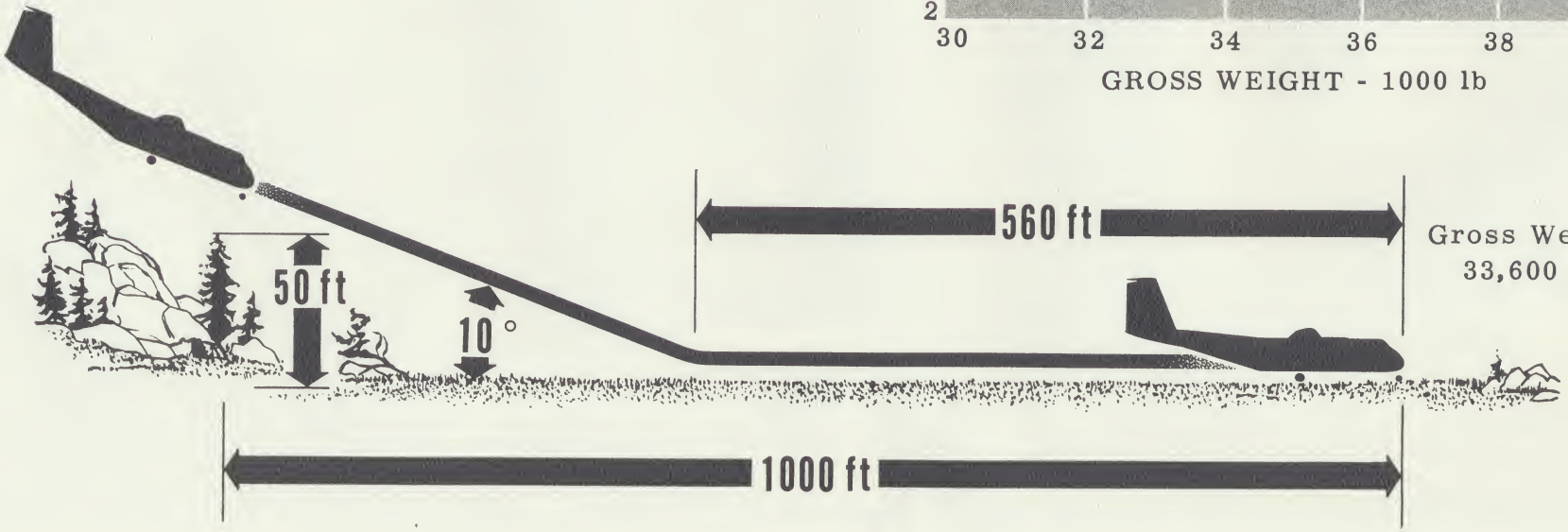
The STOL performance illustrated on these pages is largely due to a simple but very efficient high lift system, the fore-runner of which has been proven in Caribou service. There are no heavy complex cross shaftings or electronic controls to introduce unnecessary weight, maintenance, and failure.



short-field landing

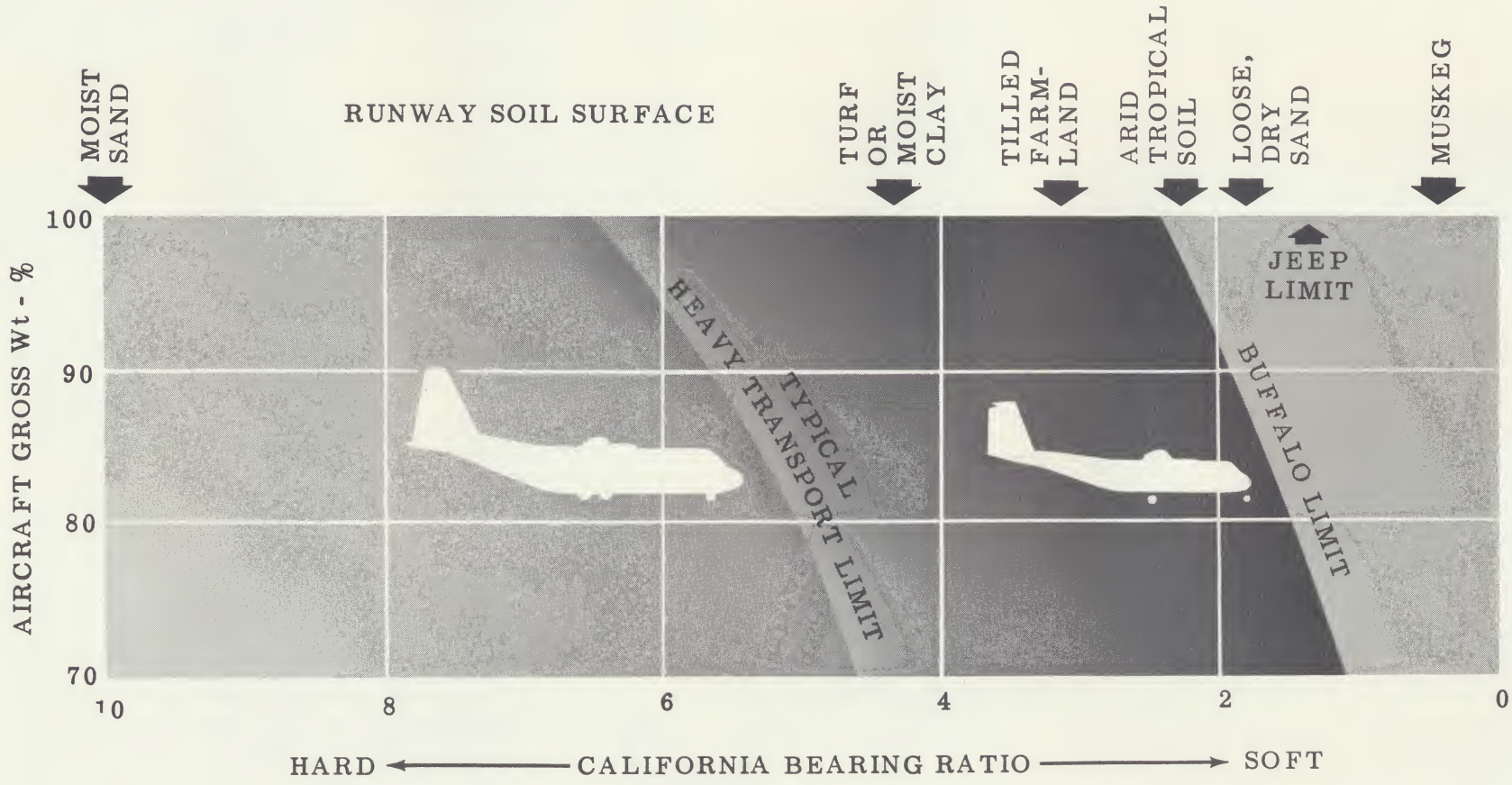
Zero Wind, Firm Dry Sod
Sea Level, ISA

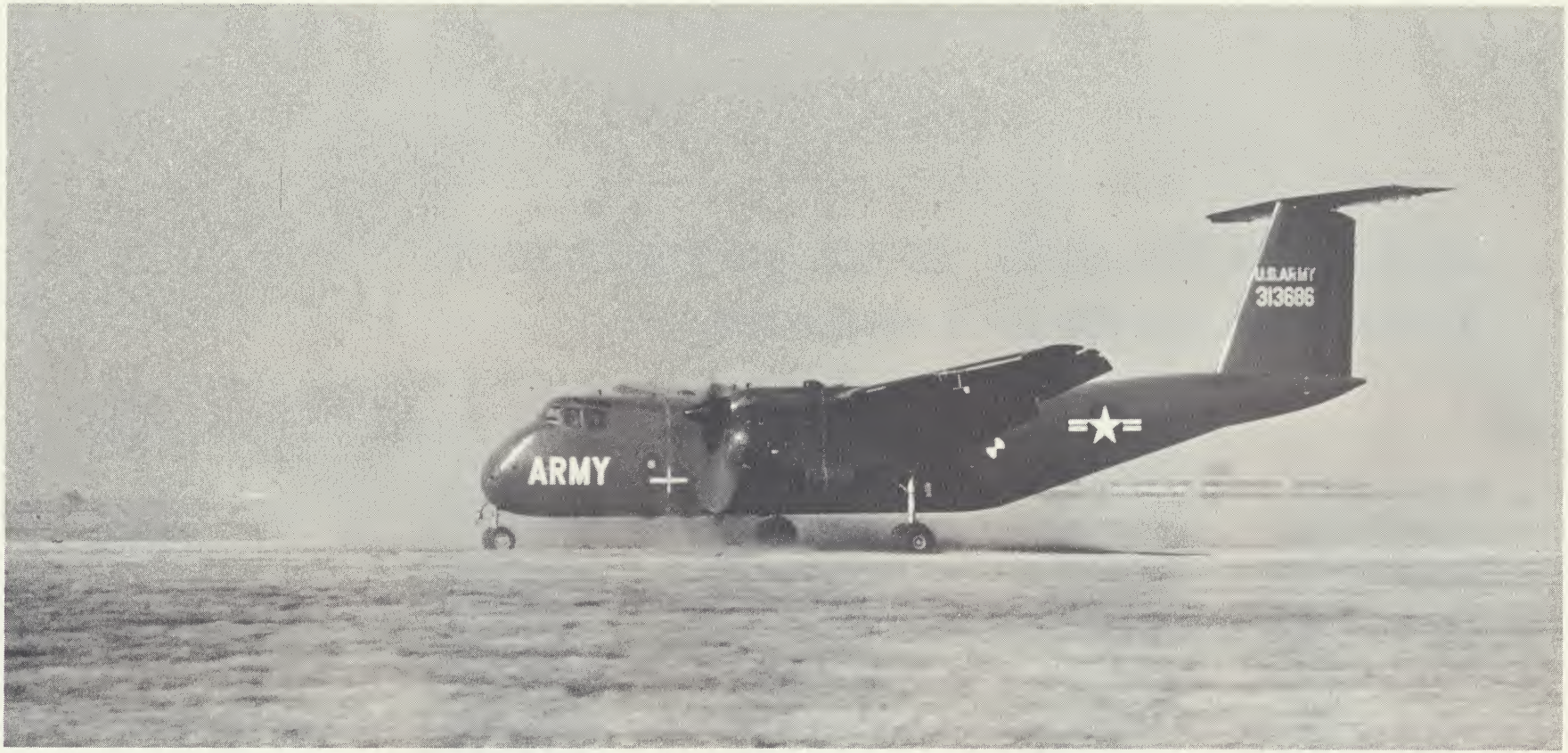




combat airfield operations

The BUFFALO's low tire footprint pressures at full weight are similar to those of cross-country ground vehicles enabling it to operate continuously from primitive airstrips which prohibit the frequent use of heavy transports.
It may be seen from the chart below that the BUFFALO can operate under adverse runway conditions well beyond the limit of other military transports.




ARMY
U.S.ARMY
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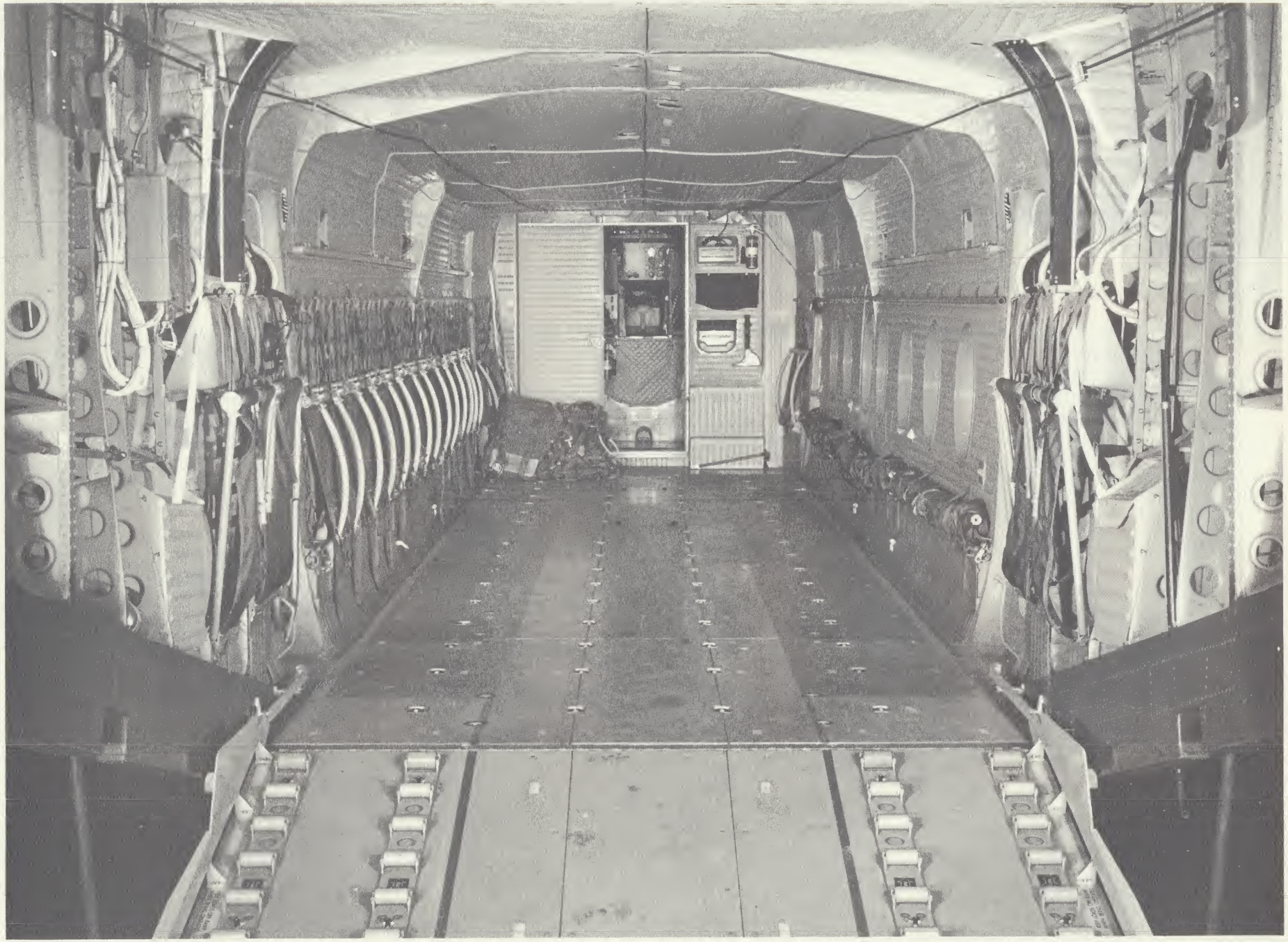
combat support comparison

		DHC-5 BUFFALO	Transport A	Transport B
Combat Field Length Req'd at Typical Wt	(ft)	1000	2000	3000
Airdrop and Lolex Speed Range	(kt)	70-80	105-125	100-120
Rate of Climb	(ft/min)	2100	900	2700
Climb Gradient	(degrees)	11	4	9
Descent Gradient	(degrees)	10	4	4
Turning Radius in Flight with "Take-off" Flap	(ft)	450	700	710
Soil Bearing Strength Req'd at Gross Weight	(C.B.R.)	2.4	6.5	7.8
Continuous sorties which can be flown from a field having a C.B.R. of 3.0	(No.)	1000	60	15
- Payload Carried	(lb)	12,780	10,000	24,000
Tonnage carried before destruction of a 2000 ft field (C.B.R. of 3.0)	(tons)	6390	300	180

The above table highlights the superiority of the BUFFALO as a support transport in front area combat conditions. In addition, the BUFFALO's steep climb and descent gradients materially reduce exposure to enemy fire.



handling qualities

The design of the BUFFALO reflects the requirement for superior handling and stability for STOL and air delivery operations under adverse military conditions. Comprehensive and very powerful controls are provided. The C of G range is wide, to accommodate heavy airdrops.

Crisp lateral control at all flying speeds is obtained by the use of wing spoilers synchronized with the ailerons.

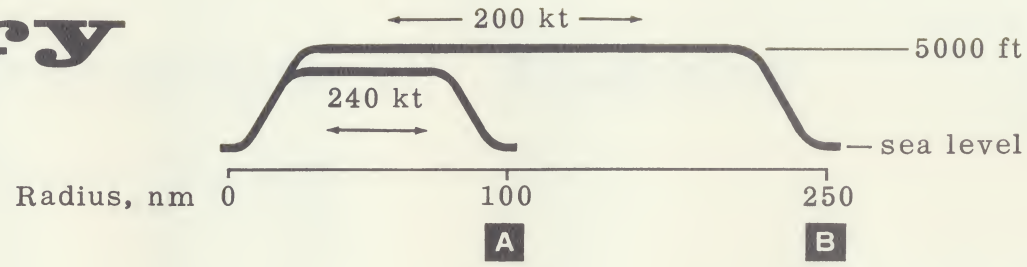
Single engine handling is enhanced by the provision of automatic propeller feathering and a powered rudder.

Automatic elevator trimming during operation of the high lift flap system protects the pilot from unusual control forces and the need for critical adjustments.

The provision of an extra low pitch stop on the propeller, together with the superior capabilities of the free power turbine for quick power acceleration or deceleration provide the thrust control necessary for precise, steep approaches to confined landing areas. The pilot's power controls have been carefully arranged for maximum ease and simplicity of operation.

The interaction of automatic lift-dumping spoilers with the reverse pitch propellers and the wheel brakes ensures a controlled short ground roll regardless of the condition of the surface.

combat mission delivery



Mission Radius	nm	100	250
Takeoff Weight	lb	39,684	41,000
Outbound Payload	lb	12,780	11,724
Inbound Payload	lb	6,390	5,862
Landing Distance from 50 ft at Mission Midpoint	ft	1,140	1,150
Landing Ground Roll	ft	690	695
Takeoff Distance to 50 ft at Mission Midpoint	ft	750	800
Takeoff Ground Run	ft	440	470

Assumptions:
ISA, Zero Wind
Fuel allowances for warmup, taxi, takeoff.
No refuelling at destination.
10% of initial fuel in reserve.

The BUFFALO operates at capacity payload and at high cruise and block speeds in most tactical support radius missions. Rough strips 700 feet long with short approaches are adequate.

load versatility

Troops, paratroops, casualties, pallets,
general cargo

UNOBSTRUCTED MAIN CABIN:

31 ft 5 in. x 93 in. x 78 in. minimum
Ground to floor height 40 in.
Full cross section rear doors
Adjustable ramp
Rear doors air operable
9ft 6 in. clearance under tail
C of G range 18.5 in.

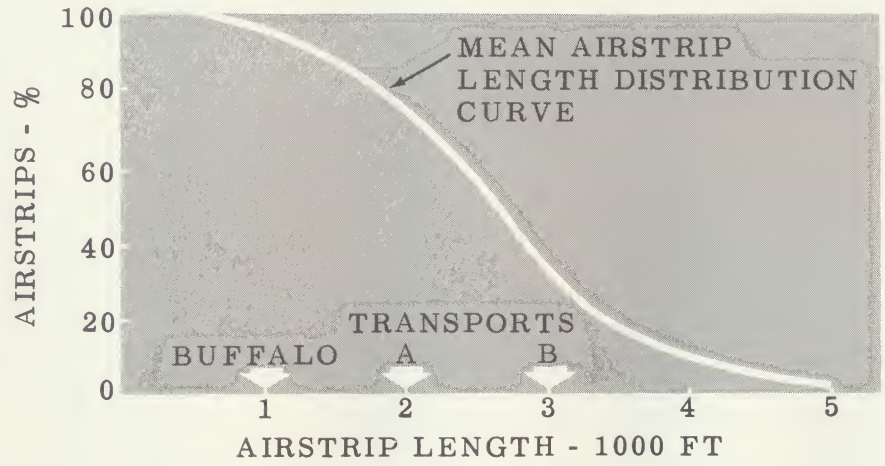
CABIN EQUIPMENT:

Heavy duty floor
Tie downs on 20 in. grid
Power winch
Roller conveyors, underfloor storage
34 folding troop seats
Parachute static line anchor cables
Ramp extensions
Automatic environment control
Provisions for 88 in. pallet rails, locks, controls
Provisions for 24 litters
Provisions for ferry fuel system

cost effectiveness

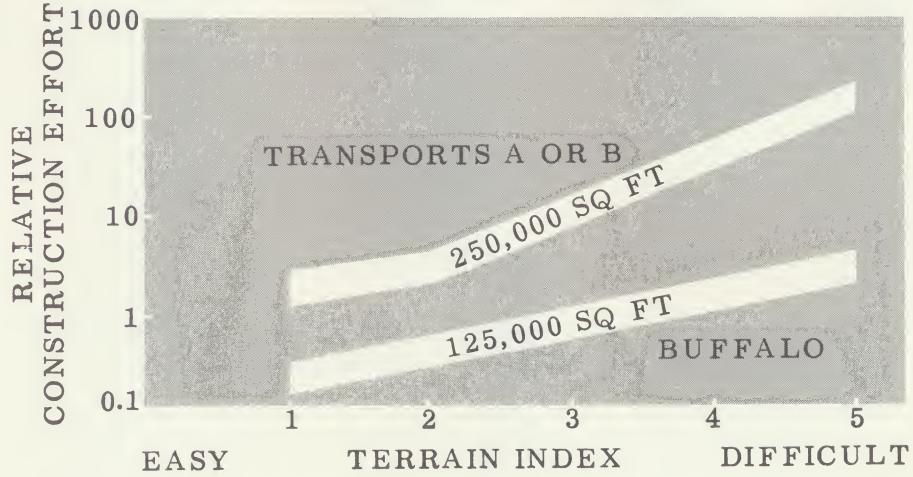
AIRSTRIP AVAILABILITY

The BUFFALO can use nearly 100% of the world's airstrips. Other current transports are severely restricted.



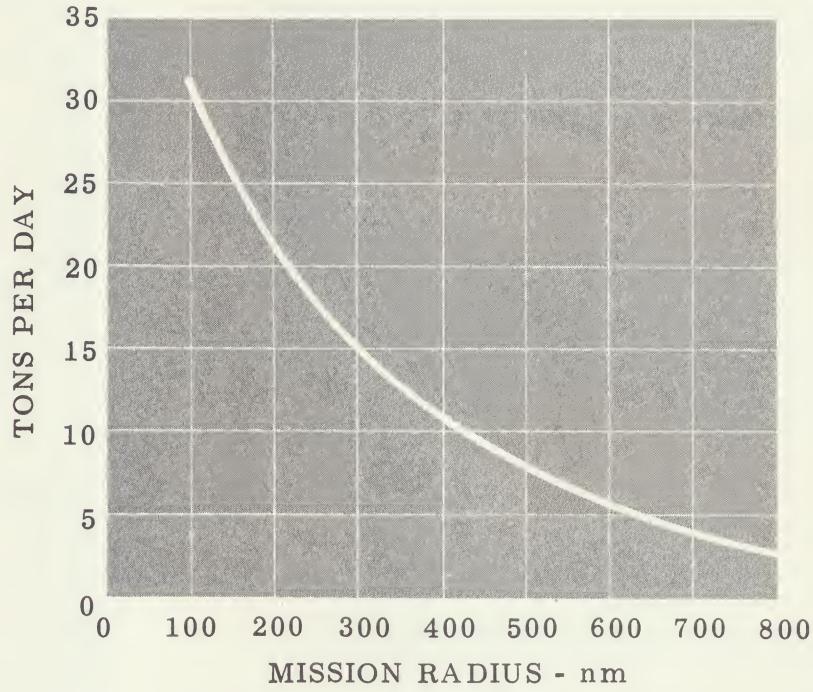
AIRSTRIP CONSTRUCTION COSTS

The BUFFALO uses short, primitive strips requiring only a fraction of the time, effort, and cost involved in normal airstrip construction.

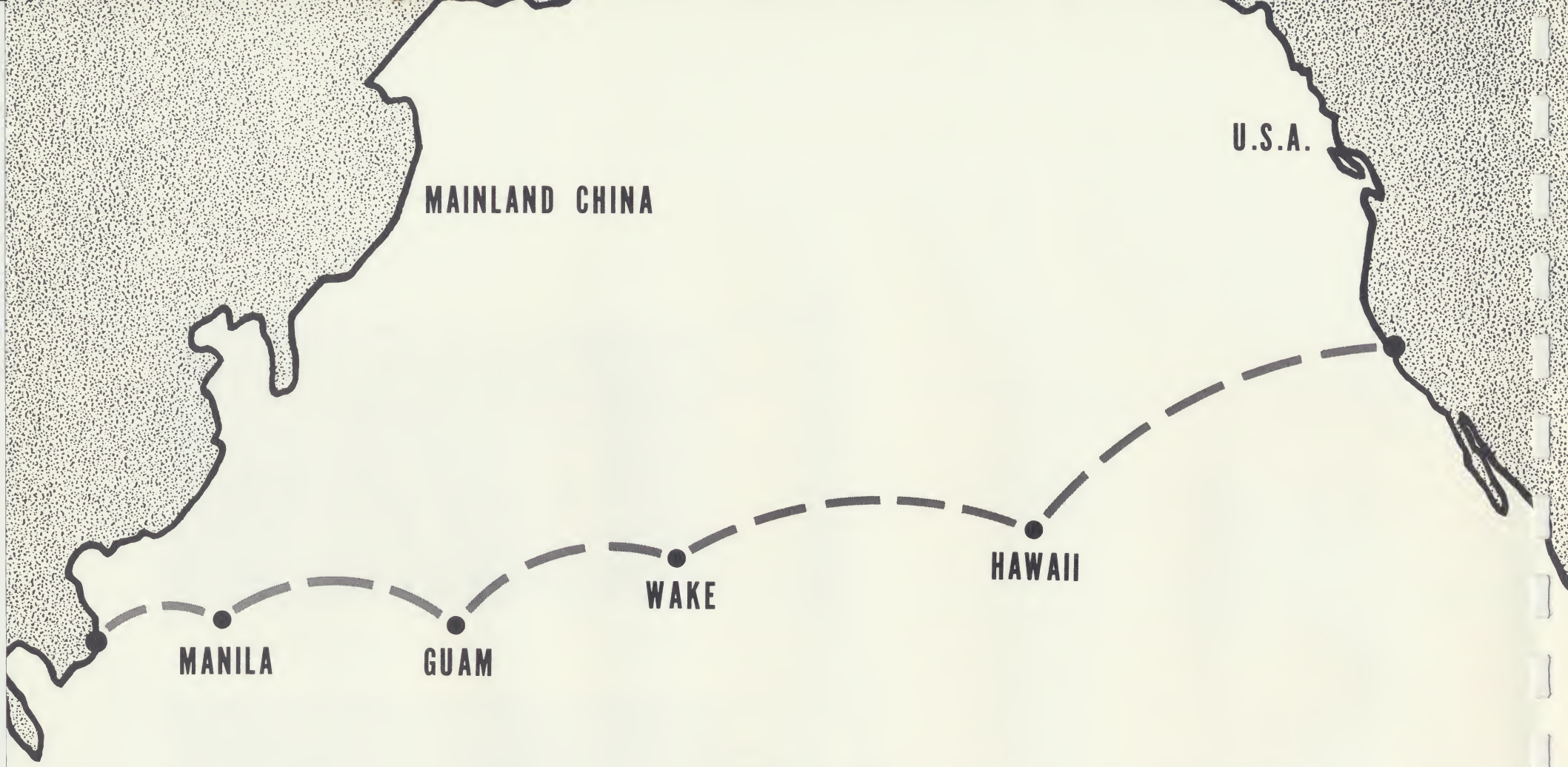


work capacity

Conditions:
Full payload out
Half payload back
Machine loading and unloading at supply base
Hand loading and unloading at destination
Operating time: 12 hrs per day
ISA, Zero Wind.



In a twelve hour period, one BUFFALO can deliver 25 tons of materiel (or 188 equipped troops) to a destination 150 nautical miles away.



ACTUAL DATA

TOTAL DISTANCE	7630 NM
FLYING TIME	35 HRS
ELAPSED TIME	41 HRS
CRUISE SPEED	200 KTS

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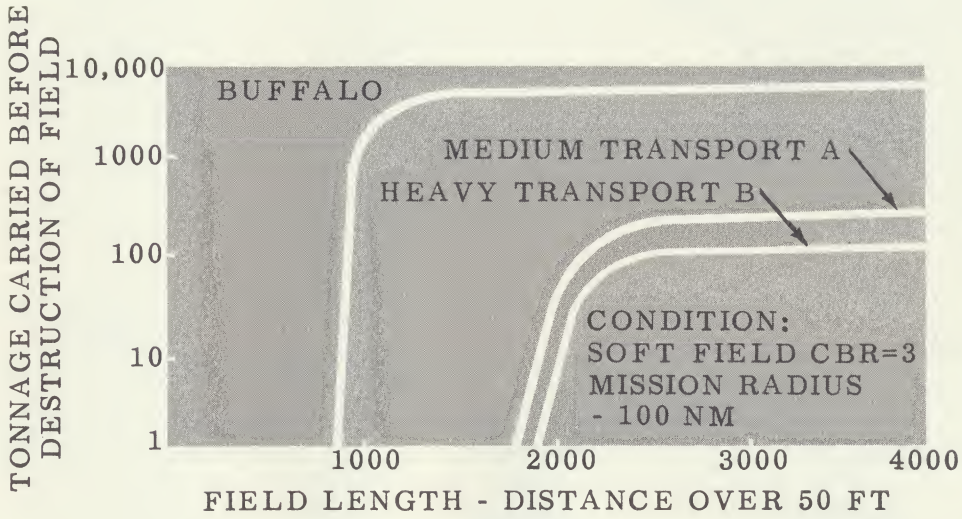
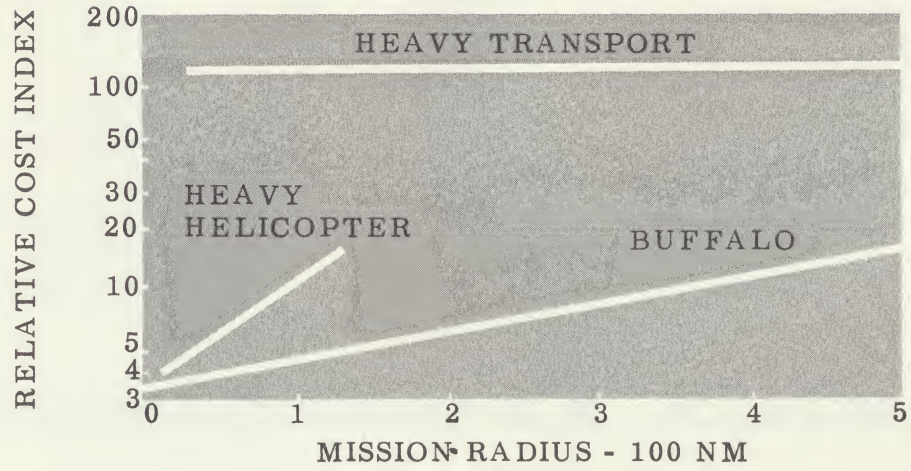
PRODUCTIVITY LIMITED BY FIELD LENGTH AND STRENGTH

When both field length and strength are marginal, as in close support conditions, the BUFFALO alone can operate effectively.



TOTAL SYSTEM COSTS

The productivity and the economy of the BUFFALO in the close support enviroment combine to make it far superior in overall cost effectiveness to other available air delivery systems.

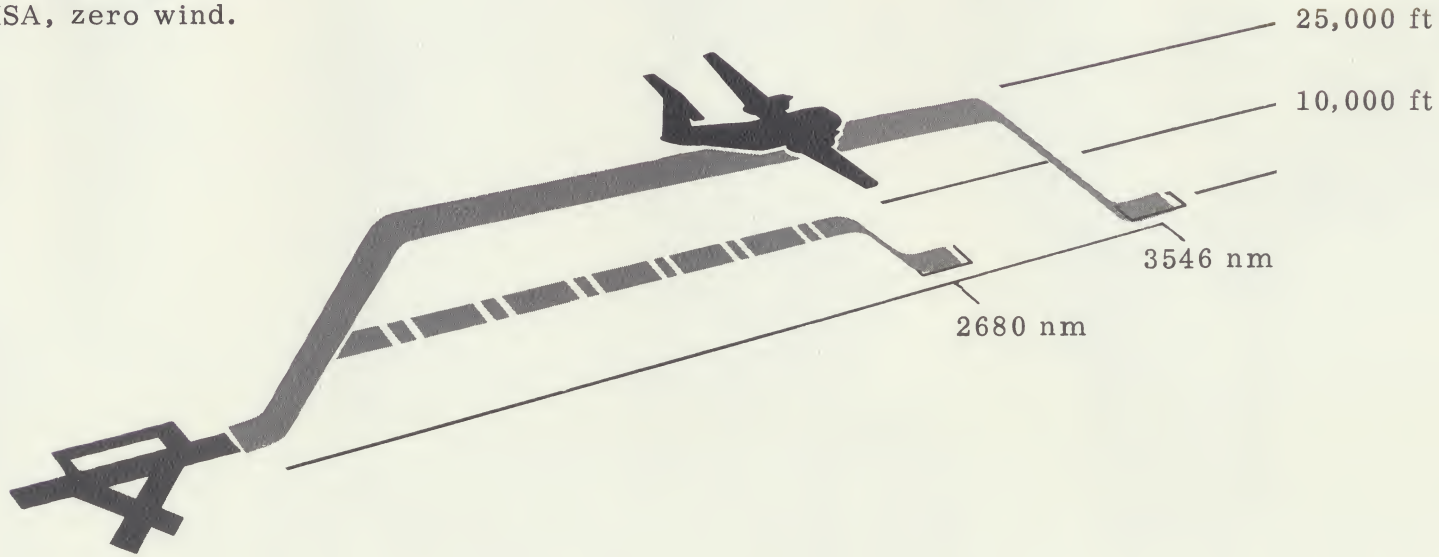


deployment

Ferry Range:	3546 nm at	25,000 ft Altitude
		or
	2680 nm at	10,000 ft Altitude

Weights:	
Oxygen, Ferry Tanks and Overseas Equipment	800 lb
Operational Empty Weight (including crew of three at 200 lb)	24,220 lb
Total Fuel	20,080 lb
Takeoff Weight (10% over maximum gross weight, Load Factor 2.27)	45,100 lb

Assumptions:
Fuel allowances for taxiing, takeoff, climb, descent and reserve of 10% initial fuel.
Long-range speed,
ISA, zero wind.



systems

In the design of the BUFFALO Systems, particular attention has been paid to simplicity, reliability and ease of access.

HYDRAULICS: Hydraulic and electrical components are mainly located in the forward fuselage, with charging and testing facilities accessible from the ground or from the cockpit, and with piping and wiring runs above the cabin ceiling.

ELECTRONICS: Electronic components are mounted in racks in the rear of the cockpit and are readily accessible during flight.

HEATING & COOLING: Heating, cooling and ventilating systems powered either by bleed air from the engines or by auxiliary power are provided for both cockpit and cabin areas. Under-floor ducting with outlets at floor level is provided in the main cabin.

DE-ICING: De-icing of the leading edges of the wing and tailplane is provided by inflatable rubber boots operated by bleed air from the engines.
The engine air intakes are protected against icing by the engine bleed-air system. The propellers have electric de-icing.

FIRE EXTINGUISHING: Powerplant fire-extinguishing is provided by a two-shot freon fire-extinguishing system which may be directed to either power plant.

CONTROLS: The flight and powerplant controls are push-rod and cable operated, with the exception of the rudder and wing spoilers, which are hydraulically operated through duplicated systems. Access to control runs is through openings in the cabin ceiling, without removal of structural components, and by hinged nose-sections on the wing.

A.P.U: An auxiliary power unit provides electric and hydraulic services on the ground, or as a stand-by in flight. It also provides compressed air for self-contained engine starting.

reliability and ease of maintenance

1. The structure and equipment of the BUFFALO are designed for simplicity, reliability and ease of maintenance. These factors have been thoroughly developed and demonstrated in the Beaver, Otter and Caribou airplanes which de Havilland has supplied throughout the world during the past fifteen years.

2. These airplanes have all been built for the same principal function: the transportation of cargo and personnel to and from short and poorly-surfaced landing areas. Each design has accumulated the experience of its predecessors and, as this experience becomes progressively more intensive, its effect on subsequent designs becomes more valuable.

3. Many of the unusual features of the BUFFALO have been developed during the design and service experience of the Caribou, so that their reliability and ease of maintenance have already been established; these include the following systems and components:

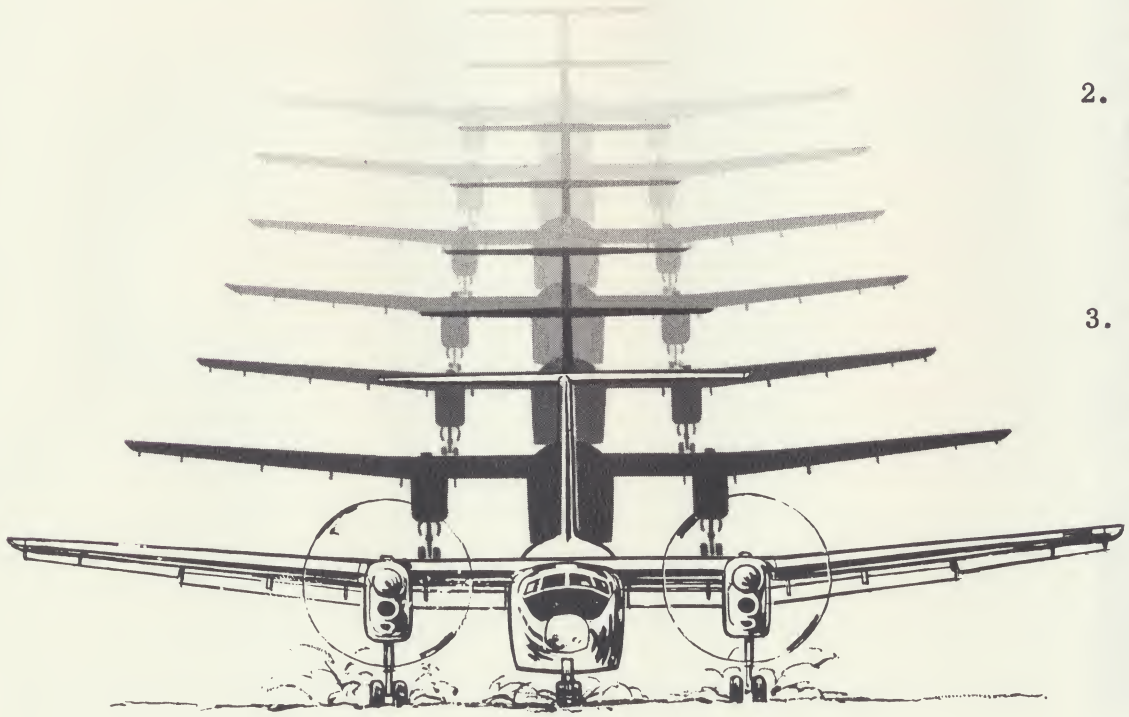
   High-lift wing flap
   Two-stage landing-gear shock absorbers
   Power-operated cargo loading ramp
   Facilities for cargo air-dropping

4. Inherently, turbine engines have relatively high reliability, easy routine maintenance and long overhaul life. In selecting the General Electric T64 turbine for the BUFFALO, particular emphasis was attached to these aspects. The T64 is described in the following pages.

The easy operation of nacelle cowlings and detachable wing panels, and free access to engine and to fuel lines are illustrated on the left.

landing gear

The BUFFALO's rugged, wide-track landing gear enables it to perform with relative ease under very adverse airfield terrain conditions and in high cross-winds.

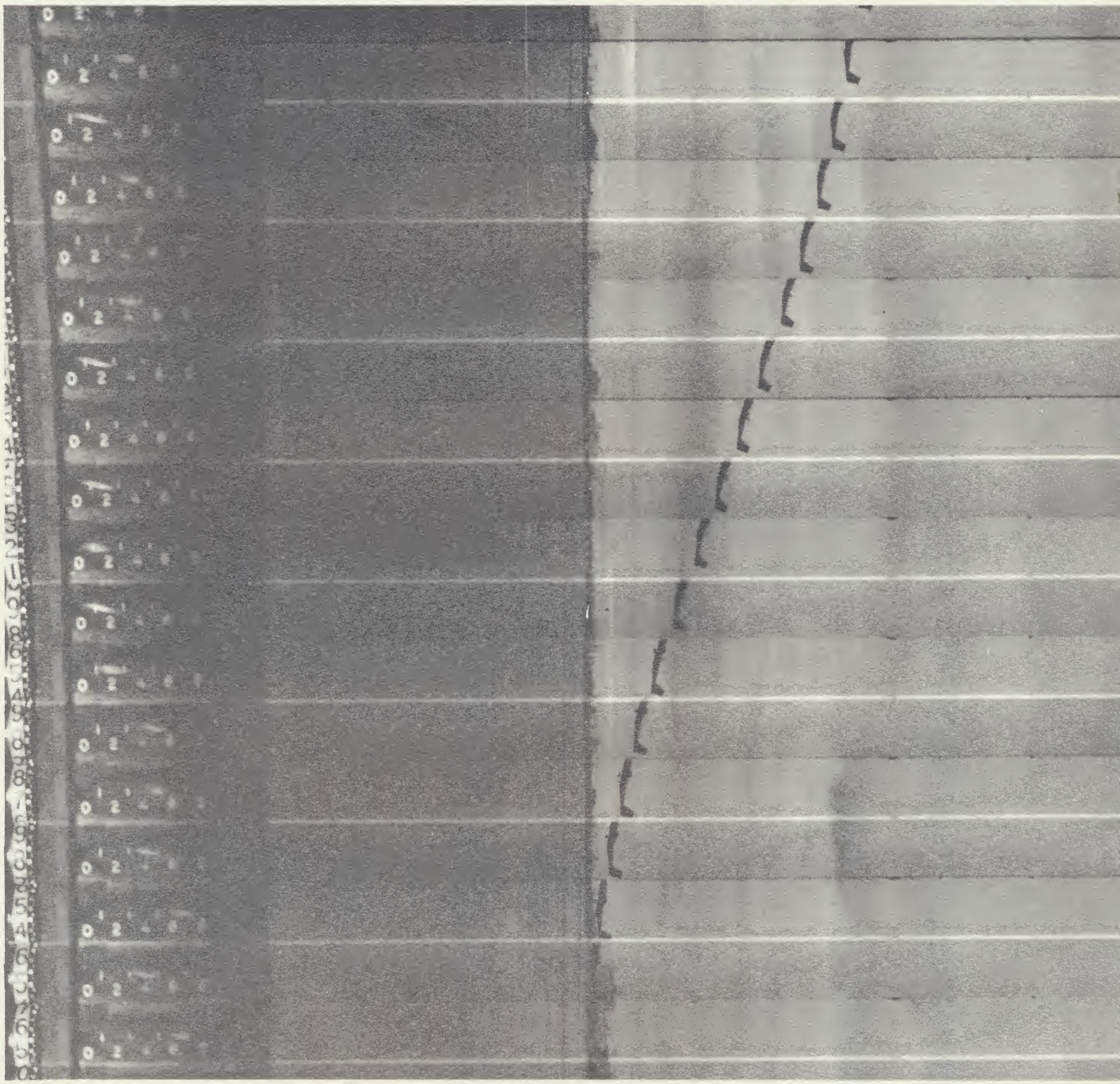


1. The landing gear has been designed to meet the requirements of operations in rough, unprepared fields. Its high energy absorption permits landings at unchecked rates of descent up to 13 ft/sec on rough surfaces which produce an additional reaction of 5 ft/sec.

2. Two-stage shocklegs on main and nose gears provide a steady platform when loading and unloading heavy equipment. They also contribute to the stability that is so essential when taxiing over rough ground.

3. The wide-track undercarriage with power-operated brakes, steerable nosewheel, low-pressure, large-radius tires and high ground clearance of the fuselage and propellers, collectively provide the Buffalo with an excellent rough-field taxiing capability.

the general electric T64



advanced design

FOR STOL POWER

1. High power to weight ratio.
2. Installation designed to avoid damage by foreign objects.
3. Fast acceleration, free-turbine power for flight control and safety.
4. Propeller fine pitch and reverse control for precise approach and ground handling.

FOR SUPPORT OPERATIONS

1. Self-contained starting system.
2. Low SFC, particularly for low altitude operations.
3. Ease of access, maintainability.
4. Initial overhaul life 600 hours; forecast increase 200 hours per year.
5. Uses JP-4, JP-5, Av Gas fuels.

FEATURES OF THE G.E. T64-14 FREE TURBINE POWERPLANT

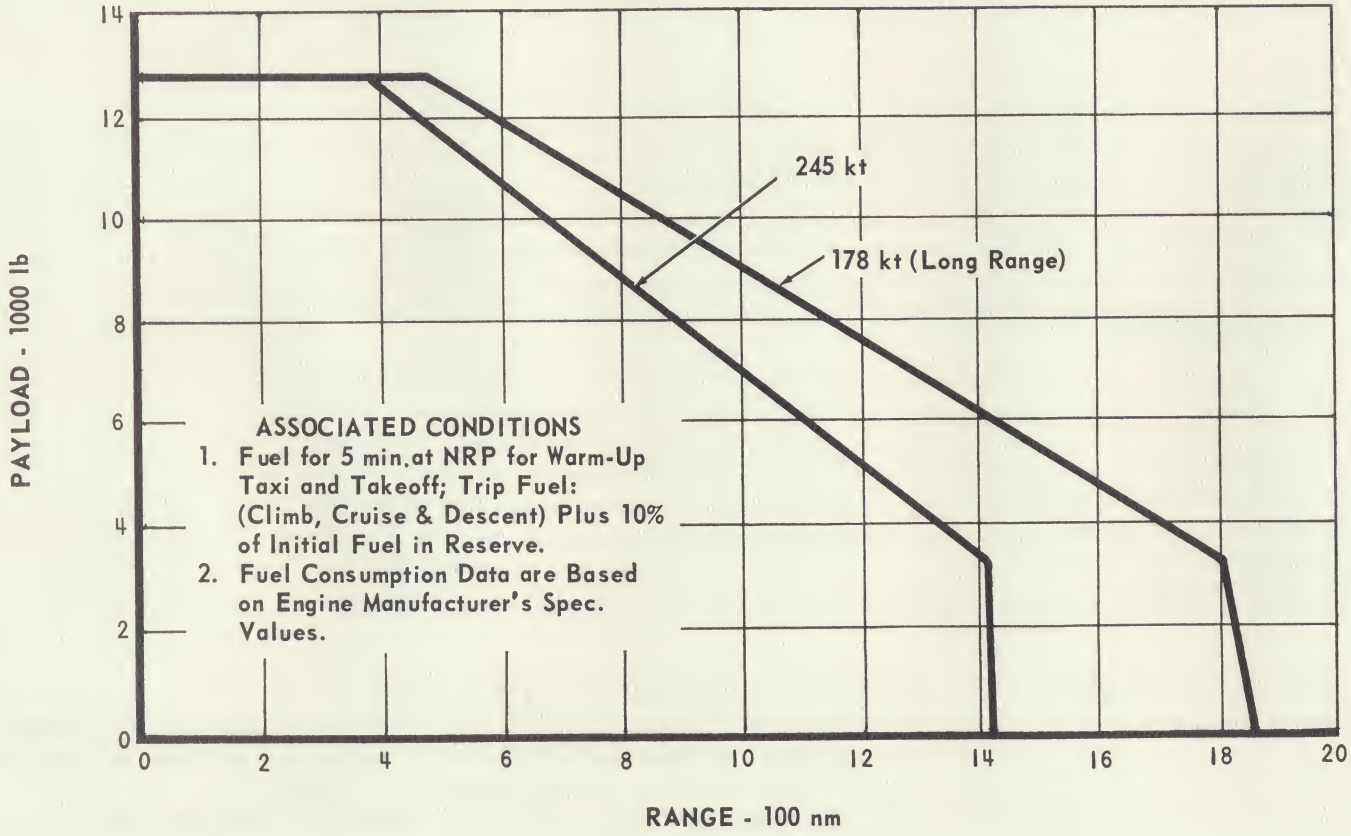
1. 14 stage compressor with split steel casing.
2. Two-stage gas generator turbine and two-stage free power turbine with split turbine casing.
3. Anti-iced front frame and inlet guide vanes.
4. Fuel control, pumps, filters and accessory pads grouped externally.
5. Externally accessible nozzles and ignitors.

ENGINE PARTICULARS
SL ISA

Take-off Power	3060 ESHP
Specific Fuel Consumption (SFC)	.488 lb/ESHP/hr.
Military Rated Power	2870 ESHP
SFC	.497 lb/ESHP/hr.
Normal Rated Power	2480 ESHP
SFC	.505 lb/ESHP/hr.
Airflow	26 lb/sec
Pressure Ratio	12.6:1
Weight	1127 lb
Power/Weight Ratio	2.71 ESHP/lb
Length	113 in.
Height	46 in.

PAYLOAD RANGE

Standard Day, Zero Wind
Gross Weight - 41,000 lb Cruise Altitude: 10000 ft



performance summary

(Sea level, ISA conditions,
except where noted)

	ENGINE T64/14
Takeoff weight	41,000 lb
Landing weight	39,100 lb
STOL takeoff distance to 50 ft (firm dry sod)	1265 ft
STOL landing distance from 50 ft (firm dry sod)	1170 ft
Rate of climb - two engines at NRP	2080 ft/min
- one engine at MP	695 ft/min
Service ceiling - two engines at NRP	31,500 ft
- one engine at MP	17,000 ft
Cruise speed (10,000 ft)	
NRP	245 kt
80% NRP	220 kt
52% NRP	181 kt
Maximum Payload	12,780 lb
Range with maximum payload	480 nm
Range with 8000 lb payload	1130 nm
Range with 4000 lb payload	1700 nm
Range with zero payload	1860 nm

NRP: Normal Rated Power
MP: Military Power

Payload range data are given with
(a) Fuel for 5 min at NRP for warm-up taxi takeoff, trip fuel (climb cruise and descent) + 10% initial fuel in reserve
(b) Cruise at long range speed at 10,000 ft
(c) Fuel consumption data are based on engine manufacturer's specification values

SHORT TAKEOFF AND LANDING DISTANCE

OVER 50 ft OBSTACLE

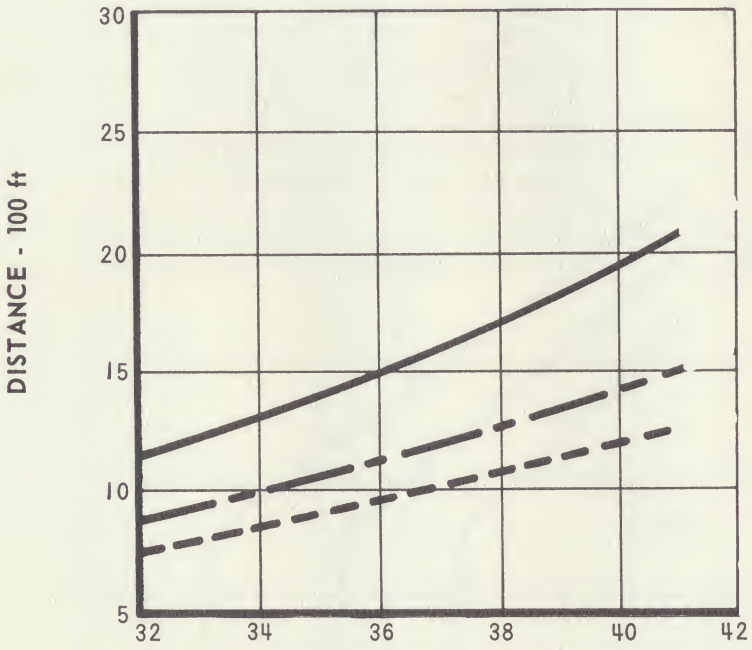
Zero Wind, Firm Dry Sod, Mid CG.

5000 ft, ISA + 15°C

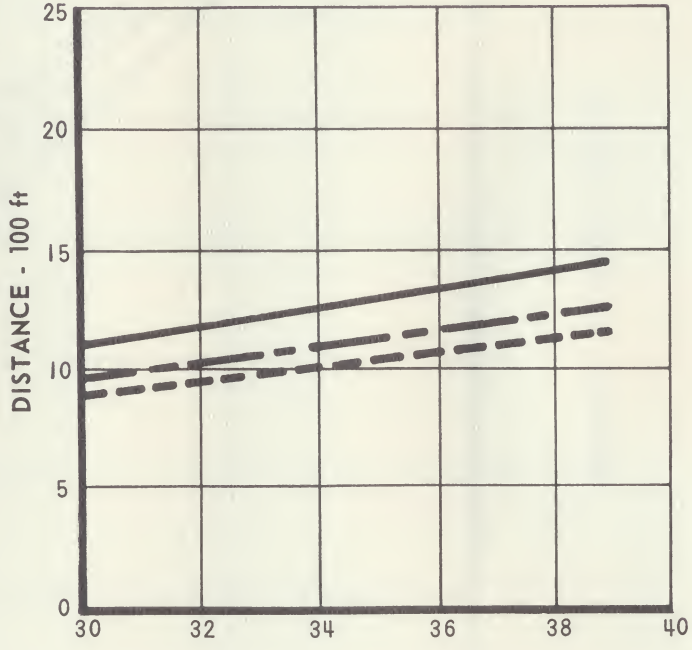
Sea Level, ISA + 15°C

Sea Level, ISA

TAKEOFF DISTANCE

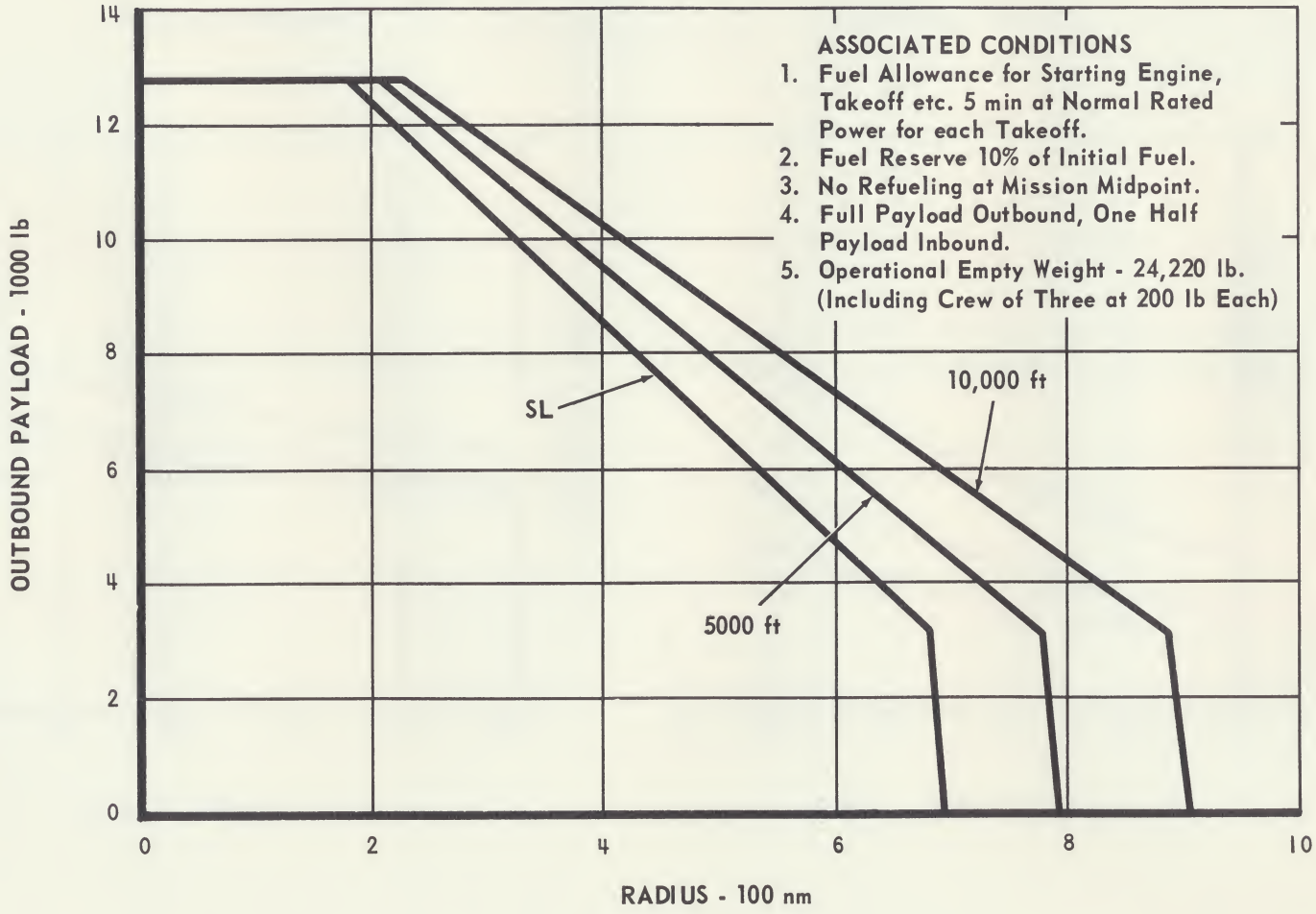


LANDING DISTANCE



PAYLOAD - RADIUS

Standard Day, Zero Wind
Cruise at Long Range Speed



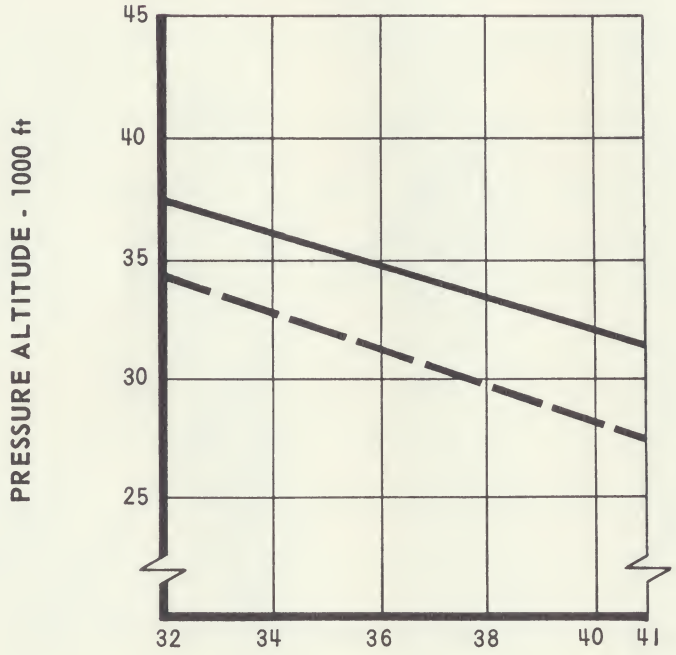
SERVICE CEILING

(RATE OF CLIMB 100 FPM)

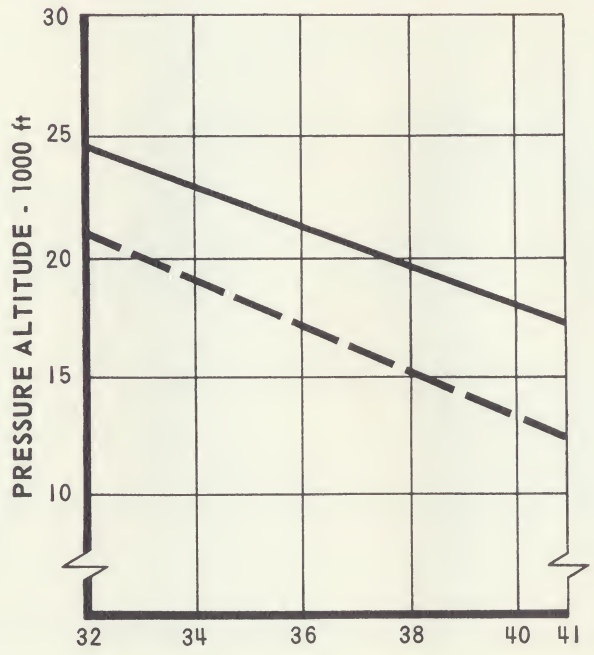
ISA

ISA + 15°C

TWO ENGINES - NRP



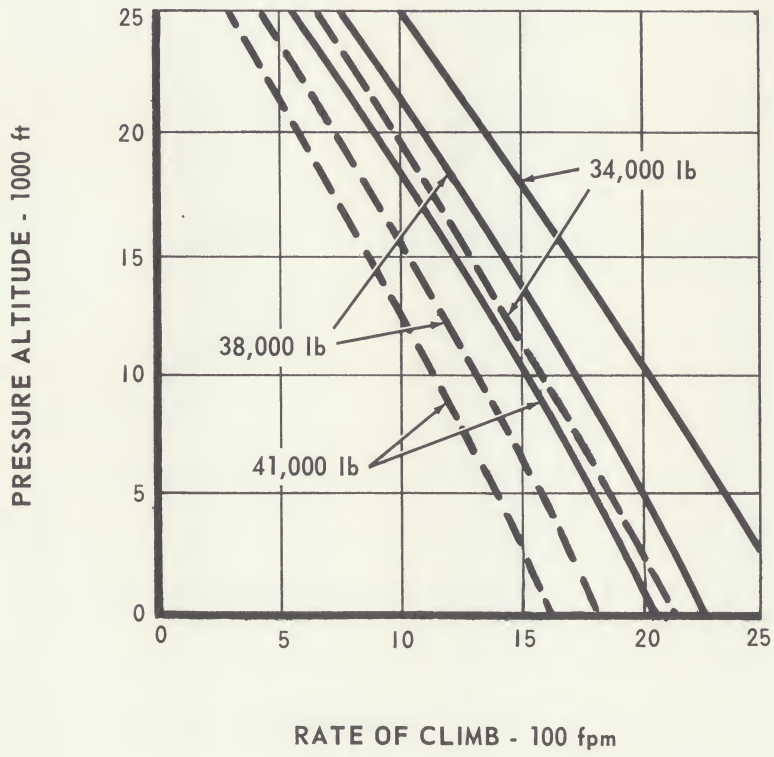
ONE ENGINE - MP



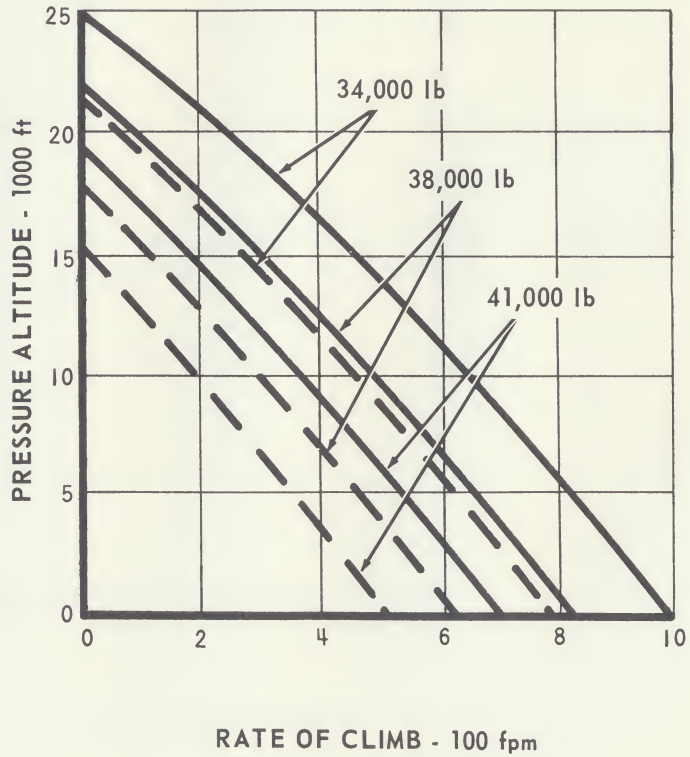
ENROUTE RATE OF CLIMB

ISA
ISA + 15°C

TWO ENGINES - NRP



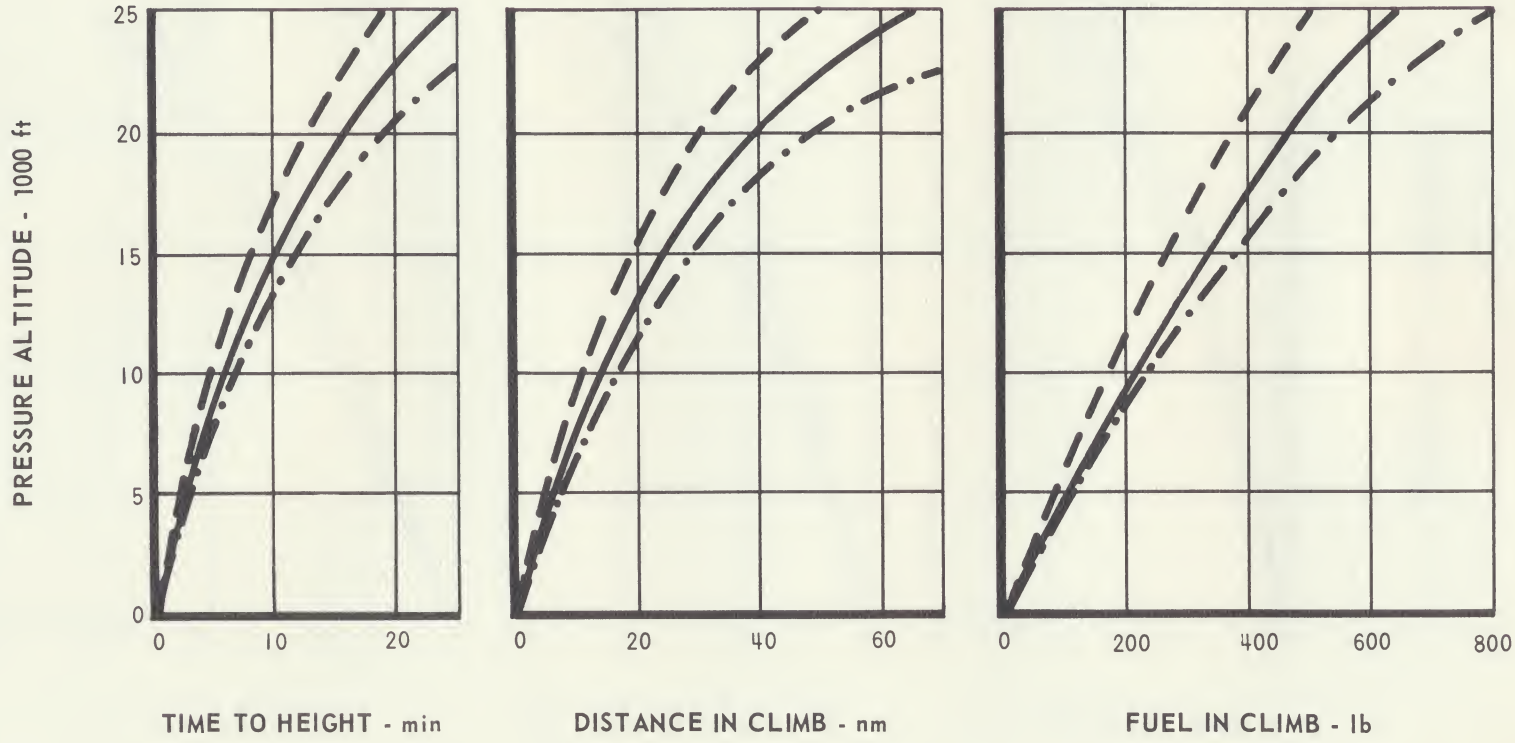
ONE ENGINE - MP



TIME DISTANCE AND FUEL IN CLIMB

Weight 41,000 lb
Weight 38,000 lb
Weight 34,000 lb

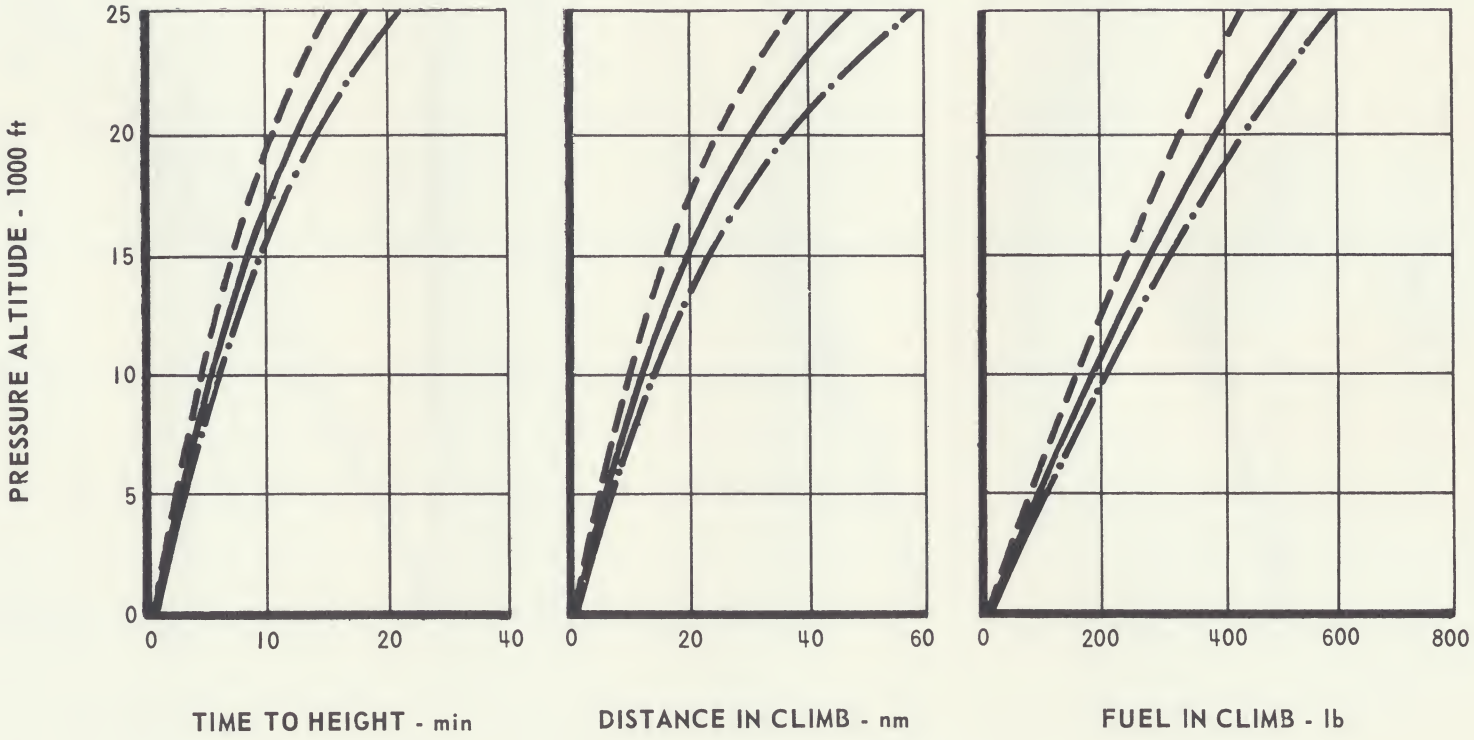
Both Engines At Normal Rated Power
Flaps, Gear Up
ISA + 15°C



TIME DISTANCE AND FUEL IN CLIMB

Weight 41000 lb
Weight 38000 lb
Weight 34000 lb

Both Engines At Normal Rated Power
Flaps Up, Gear Up
ISA



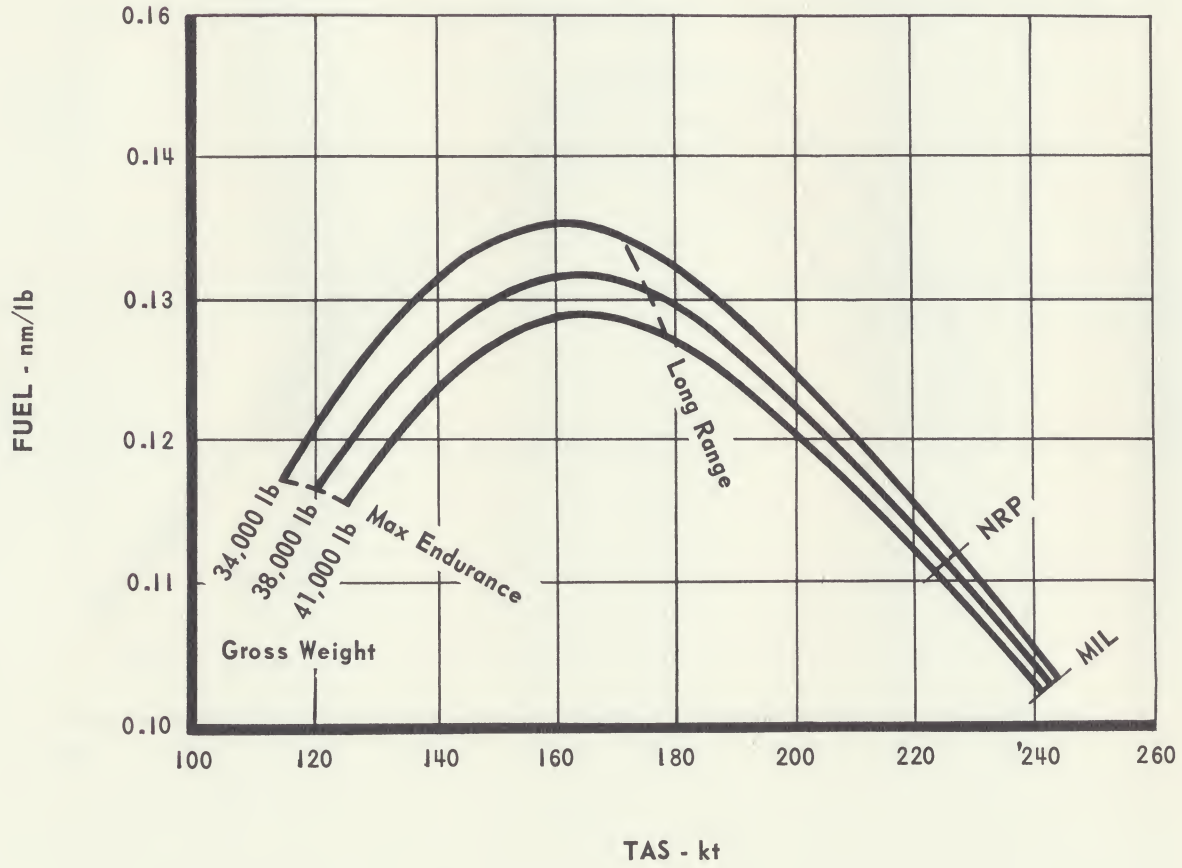
SPECIFIC AIR RANGE

5000 ft ISA + 15°C

Flaps Up, Gear Up

2 Engines Operating

Fuel Consumption Data are Based on Engine Manufacturer's Spec Values



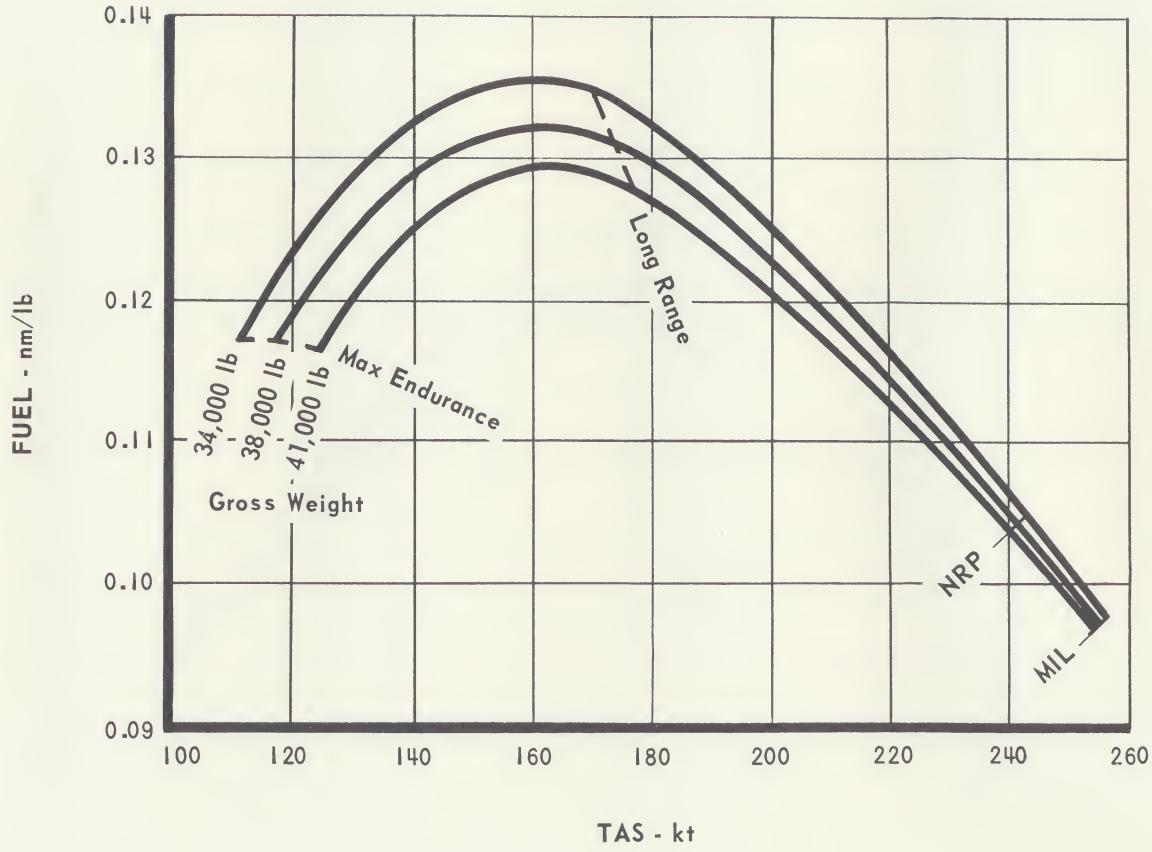
SPECIFIC AIR RANGE

5000 ft ISA

Flaps Up, Gear Up

2 Engines Operating

Fuel Consumption Data are Based on Engine Manufacturer's Spec Values



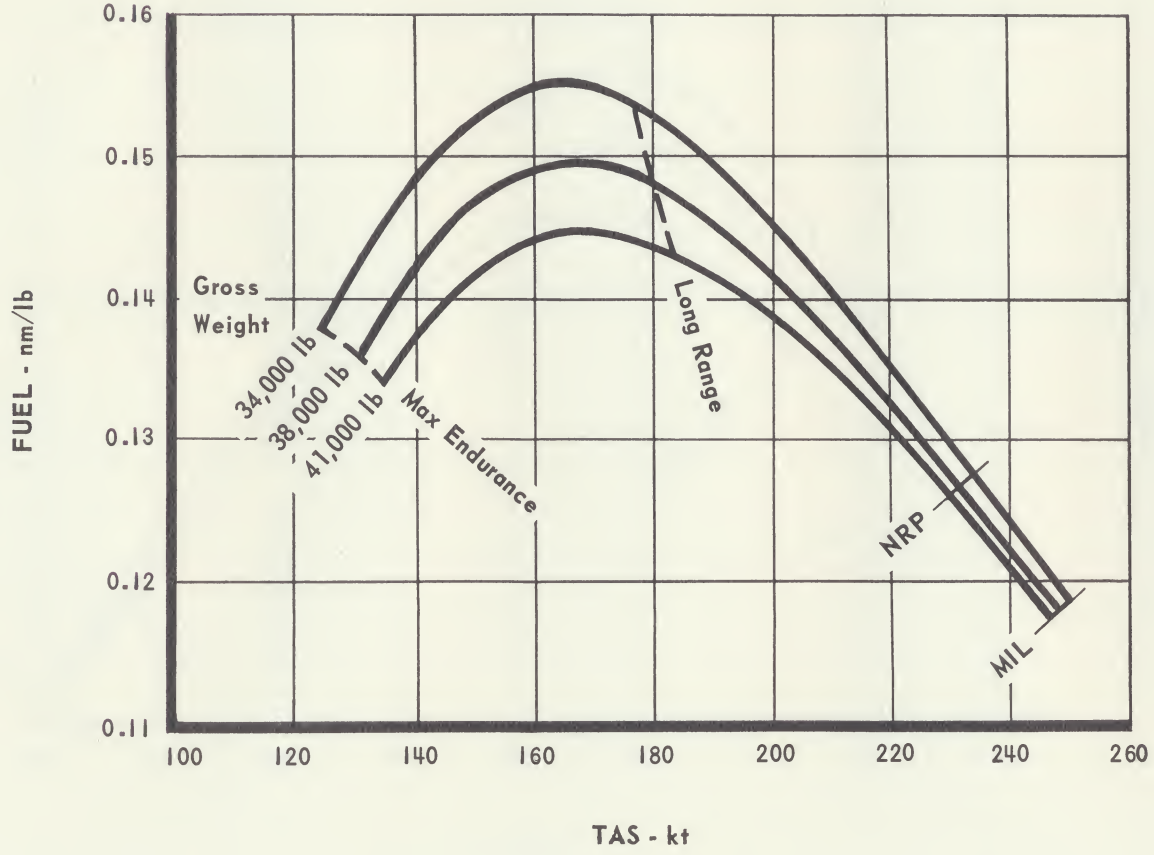
SPECIFIC AIR RANGE

10,000 ft ISA + 15°C

Flaps Up, Gear Up

2 Engines Operating

Fuel Consumption Data are Based on Engine Manufacturer's Spec Values



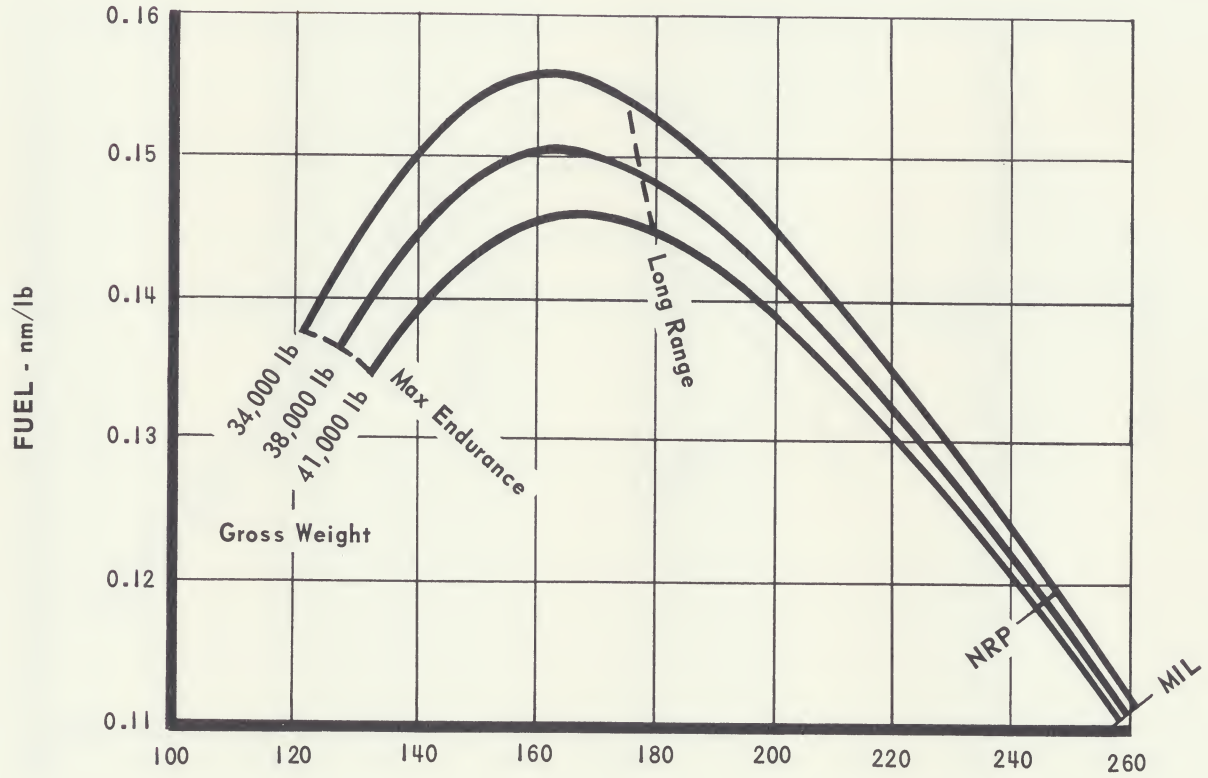
SPECIFIC AIR RANGE

10,000 ft ISA

Flaps Up, Gear Up

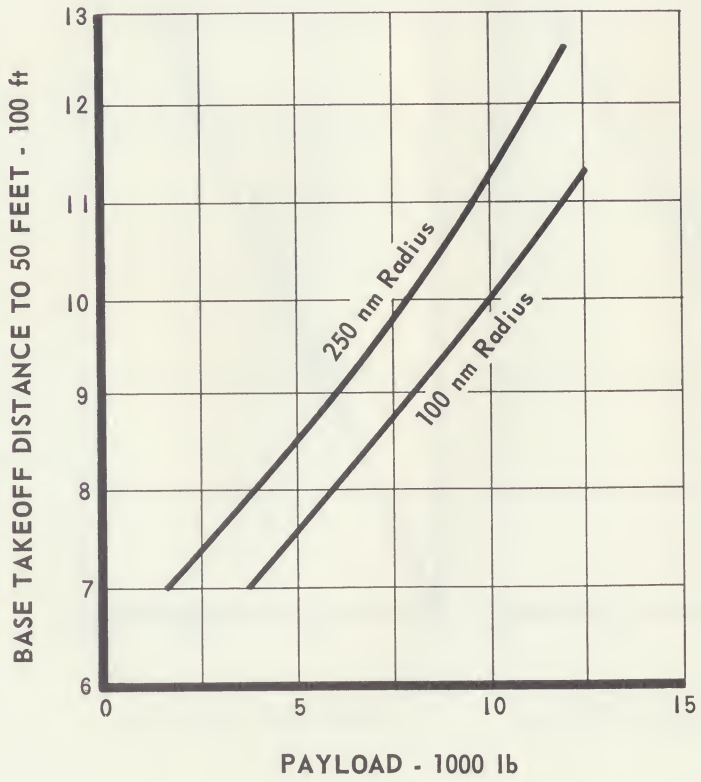
2 Engines Operating

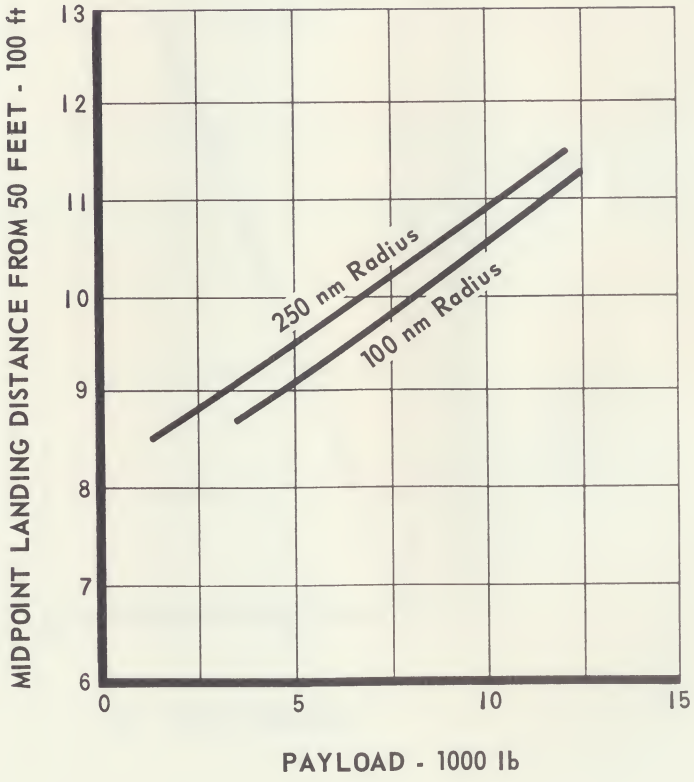
Fuel Consumption Data are Based on Engine Manufacturer's Spec Values



TAKEOFF DISTANCE AND LANDING DISTANCE vs PAYLOAD

ASSUMPTIONS
1. Cruise at Long Range Speed
2. Firm Dry Sod
3. ISA
4. Mid CG

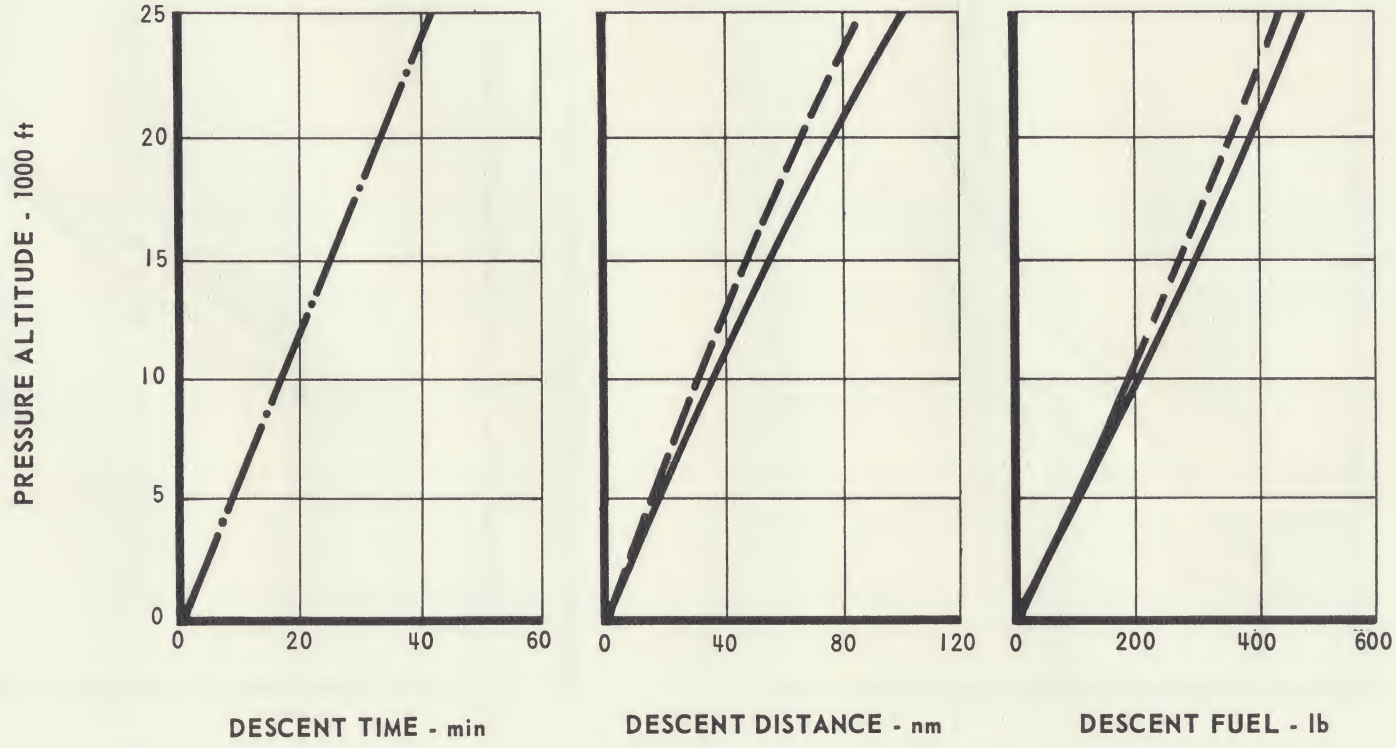




TIME DISTANCE AND FUEL IN DESCENT

ISA

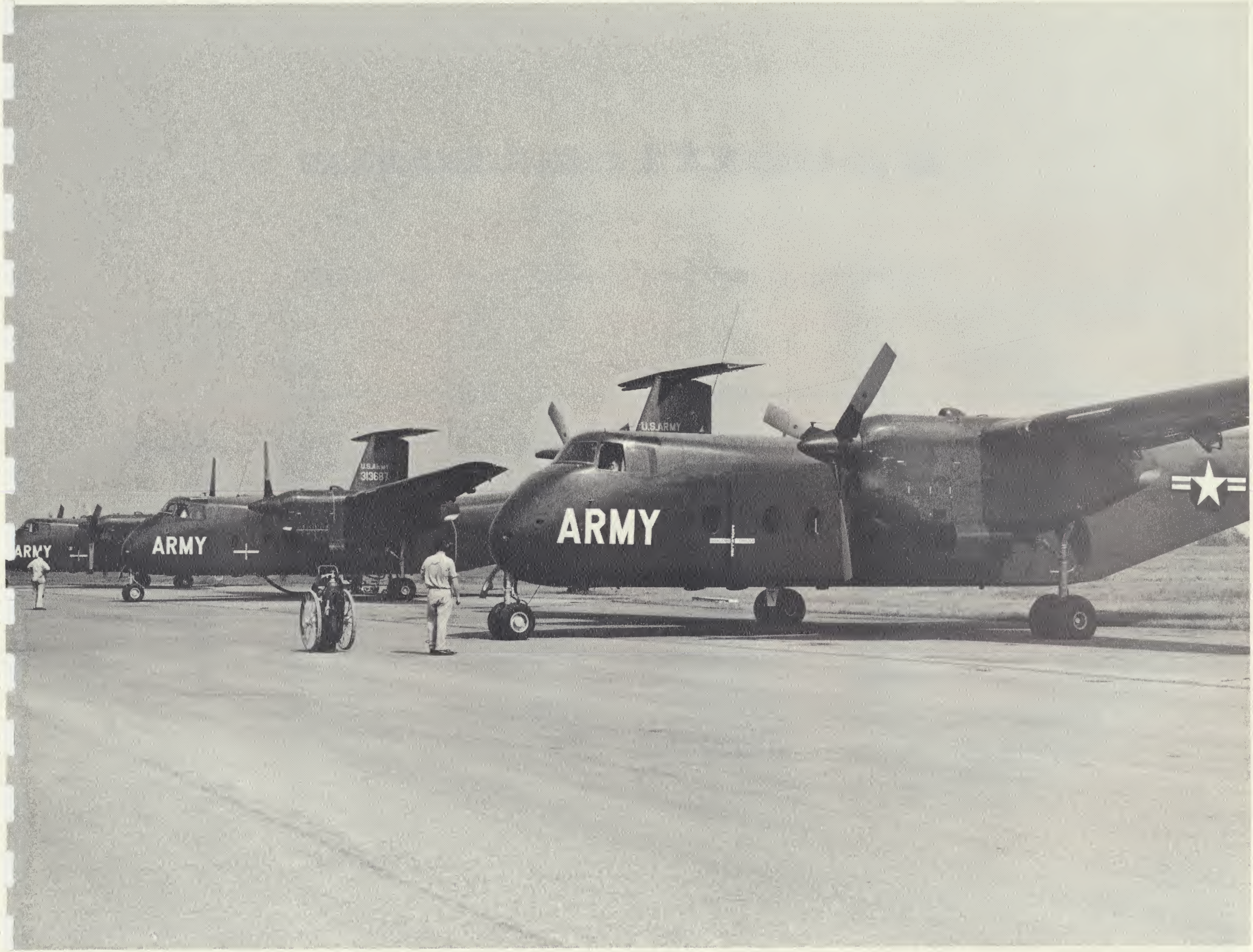
All Weights
Weight 41,000 lb
Weight 30,000 lb



specifications

The following equipment items are included in the basic aircraft.

ELECTRONICS	FURNISHINGS	SYSTEMS
Communication: VHF Radio UHF Radio FM Radio and Homer Audio Control and Interphone Navigation: VHF Navigation (2) ADF Navigation MB, GS Gyromagnetic Compass Identification: IFF with SIF	Seats, Belts and Harnesses for Three Crew. Crew's Oxygen System. 34 Troop Seats with Belts. Litter Provisions. Cockpit and Cabin Upholstery and Insulation. Heavy Duty Cargo Floor. Cargo Winch, Roller Conveyors. Emergency Equipment. Windshield Washers and Wipers. Stowage Boxes for Tie-Downs, Data Cases, etc. Loading Ramp Extension. Parachute Anchor Cables. Self-Sealing Fuel Tanks. Aircraft Paint.	Pressure and Gravity Refuelling. Air Conditioning. Deicing for Airframe, Air Intakes, and Propellers. Auxiliary Power Unit. Self-Contained Starting System. Reversing Propellers. Flight and Engine Instrumentation Complete.


ARMY
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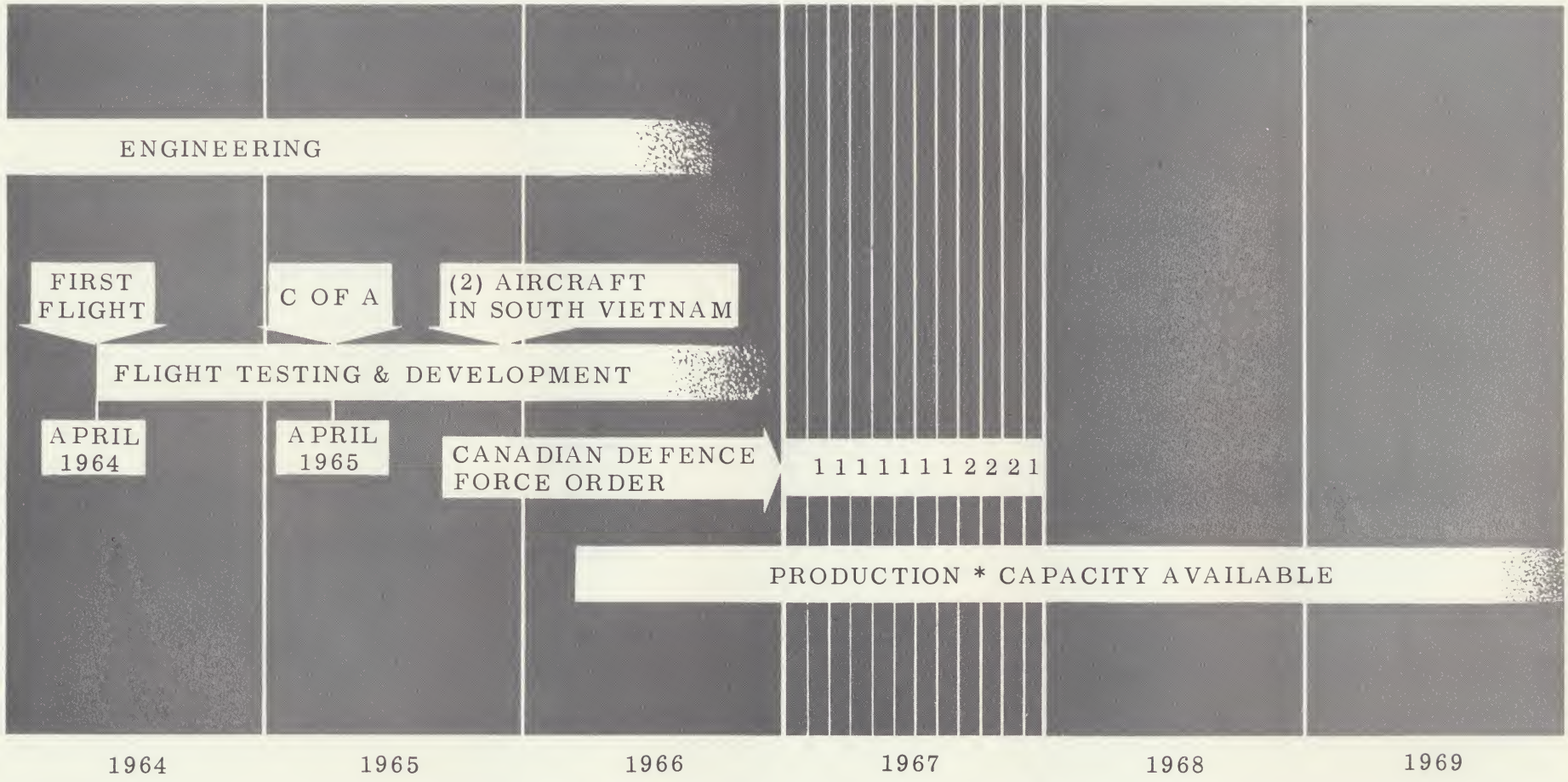
U.S.ARMY
313687

program schedule



* AIRCRAFT AVAILABLE 14 MONTHS FROM RECEIPT OF ORDER. PRODUCTION RATE DETERMINED BY ORDER REQUIREMENTS.

optional equipment

FURNISHINGS & EQUIPMENT	Wt-lb
Seven Forward Facing Seats	63
Armor Plated Sump Covers (2)	80
Side Guidance System & Pallet Locks	344

Note
Fixed provisioning for all the above items is included in the basic aircraft.

ELECTRONICS

HF Radio
TACAN
Weather Radar
Doppler Navigator
Integrated Flight System

(Customer required equipment can be installed at request.)

a word about DHC

Established in 1928, The de Havilland Aircraft of Canada Limited is Canada's oldest aircraft company. Specializing since 1946 in the development of STOL utility aircraft for both military and civil application, de Havilland has enjoyed a long association with the United States Armed Forces. More than one thousand de Havilland Beavers have been supplied to the U.S. Air Force (U-6A) and the U.S. Army (U-6A), joining hundreds of others operating in over 65 countries throughout the world. Over 300 other de Havilland utility aircraft have also been operating with the U.S. Army since 1955.

De Havilland Canada's aircraft division located on the outskirts of Toronto is comprised of a manufacturing complex adding up to over 1 million sq feet of floor area. Its work force of about 4000 includes an aeronautical engineering team with over 18 years experience in the design of proven STOL aircraft, and its manufacturing and inspection methods have helped to establish a reputation of rugged reliability for its products.

De Havilland Canada's Special Products and Applied Research Division has established the Company's position in the new technology of aerospace.

Continued research, particularly in the field of Short-Takeoff and Landing aircraft, has secured widespread markets for de Havilland of Canada products. Recent introduction of three turbine powered STOL aircraft -- the Turbo-Beaver, Twin Otter and Buffalo -- is confidently expected again to carry the de Havilland name into worldwide markets.

THE DE HAVILLAND AIRCRAFT OF CANADA LIMITED

DOWNSVIEW ONTARIO

June 1/66/E